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14. ABSTRACT To identify metastatic suppressor genes (MSGs), I proposed to perform genome-scale genetic perturbation using lentiviral delivered shRNA library in a mouse model of breast cancer metastasis and an in vitro metastasis assay. To enhance the screening throughput and robustness of the mouse metastasis model, I calibrated an ALSV-based lentiviral gene delivery system. This system achieved reasonable virus delivery efficiency in vitro and to subcutaneously formed tumor in vivo. However, it failed to delivery genes to primary breast tumor in vivo. In parallel, I generated list of candidate MSGs and tested the shRNAs for selected candidate for pilot screen in vivo. The MSGs includes known/putative MSGs through literature research and genes that is essential specific to metastatic breast cancer cell lines. Further experiment is on going to use the candidate list to calibrate the in vivo and in vitro metastasis assay systems.				
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Introduction

Metastases are major cause of cancer death. Although recent advances have revealed gene signatures that predict the risk of metastasis, we still lack insight into the molecular mechanism(s) that underlie this process. In this breast cancer research training program, I proposed to identify metastasis suppressor genes (MSGs) by systematically manipulating gene expression using genome-scale pooled shRNA library in experimental breast cancer metastasis models. I expect to identify a number of candidate MSGs using this approach. To prioritize genes for further study, candidate genes will then be compared with data derived from genomic analysis on human metastasis breast cancer to identify MSGs. Putative MSGs will be further characterized for their role in breast cancer metastasis.

Body

Metastasis is a complex process involving in genetic alterations of tumor cells and homeostatic changes in the host. Mouse model of breast cancer metastasis best recapitulates the entire pathological process among numerous assays modeling metastasis. To identify potential MSGs, I proposed to introduce pools of The RNAi consortium (TRC) library into non-metastatic breast cancer cell lines, then implant the cells to mammary fat pad to form primary tumor and select shRNAs that promote metastasis (Aim 2 in proposal). One technical challenge of using this system to perform a genome-wide perturbation is that only a fraction of cells are able to form primary tumor at mammary fat pad and therefore losing the complexity of the shRNA library. My current work tackles this problem from two aspects:

- (I) To introduce virus library directly to primary tumor
- (II) To reduce the complexity of shRNA library by generating a high priority list of genes for *in vivo* MSGs screening

(I) To introduce virus library directly to primary tumor

Current strategy to use shRNA library for *in vivo* MSGs discovery involves first introducing shRNA library to tumor-derived cell lines, then transplanting these engineered cell lines into immunocompromised mice via orthotopic xenograft or intravenous injection and last deconvoluting shRNA library from metastatic tumor. There are couple disadvantages associated with this strategy: (1) The shRNA library is introduced to tumor-derived cell lines rather than tumor cells of origin. (2) The engineered cell line is introduced to immunocompromised mice and therefore the result cannot account the effect of host immune system towards tumor formation and metastasis. (3) When introducing engineered cell line to the host through orthotopic xenograft, only a fraction of cells can initiate tumor after transplant *in vivo*, therefore compromising the capacity of this system to screen a large panel of candidate shRNAs. (4) When introducing engineered cell line to the host through intravenous injection, the system only examines the later portion of metastasis rather than the full spectrum of this process. To study metastasis with mammary origin in non-immunocompromised mice *in vivo*, I took advantage of an established virus infection system to allow delivery of shRNA library to tumor *in vivo*.

This virus infection system takes advantage of avian sarcoma-leukosis virus (ASLV) which specifically infects cells expressing TVA receptor. In last report, I demonstrated the lentiviral vector, pseudotyped with the envelope protein of ALSV subgroup A (EnvA), is able to deliver and express target gene specifically in cell lines expressing TVA receptor *in vitro*. Furthermore, I demonstrated the infection efficiency of EnvA lentivirus in subcutaneously formed tumor when the virus is delivered by tail vein injection.

To test whether this system allow me to deliver virus to mammary tumor *in vivo*, I first conducted experiment to see whether ASLV based virus delivery can introduce oncogene to mammary epithelial cells expressing TVA receptor and promote primary mammary tumor formation. I obtained transgenic mice with TVA receptor under the control of mouse mammary tumor virus (MMTV) promoter from Dr. Yi Li (Baylor College of Medicine). It has been demonstrated that somatic delivery of either mouse polyoma virus middle T antigen (PyMT) or neu oncogene using ALSV-based retroviral vector to MMTV-TVA mice induced the formation of multiple, oligoclonal tumors within 3 weeks in infected mammary glands [Du Z, et al. 2006]. To further promote tumor formation in this mouse model, I generated MMTV-TVA/p53(-/-) mice by crossing MMTV-TVA mice with p53 null mice. The rationale is basing on previous publications showing strong cooperative effect between HRas or neu with p53 mutation in forming mammary tumor [Hundley, J.E., et al., 1997; Li, B., et al., 1997]. To induce primary tumor formation, EnvA lentivirus encoding HRas or neu protein was delivered to 8-weeks old female MMTV-TVA and MMTV-TVA/p53(-/-) mice through tail vein injection. Five mice from each genetic background were injected for each oncogene. Three injections were done for each mouse in three consecutive weeks. Mouse mammary tissue had been monitored for 5 months by palpation. No breast tumor was identified under any of the experimental conditions. One possible explanation is that the efficiency of virus delivery to mammary epithelial tissue is poor.

In parallel, I am initiating part of the *in vivo* screening experiment described in Aim1 and 2 in the proposal. Current working in progress includes:

- (1) I obtained the dual-color cell cycle reporter from Dr. Atsushi Miyawaki (RIKEN, Japan) and I am current testing the validity of this reporter.
- (2) I plan to introduce this dual-color reporter to both metastatic and non-metastatic breast cancer cell lines and assay whether this reporter can distinguish proliferating vs. dormant colonies *in vivo*.

(II) To reduce the complexity of shRNA library by generating a high priority list of genes for *in vivo* MSGs screening

In order to perform *in vivo* MSGs screen successfully, I decided first to perform pilot screen using a shRNA library consisting of genes with high potential to be MSGs. My rationales are as following:

- (1) Recently, Possemato et al. successfully performed negative selection genetic screen looking for breast cancer target using mouse model of breast cancer [Possemato,R., et al., 2011]. The authors first introduce shRNA library to breast cancer cell lines *in vitro*, which were subsequently injected to mammary fat pad to assay tumor maintenance phenotype. In this study, a shRNA library targeting 133 metabolic enzyme and transporter genes was used. Adaptation of a smaller library enriched of biological candidate allows the screen to be conducted under stringent condition.
- (2) As proposed in Aim3, I will prioritize candidate MSGs obtained from *in vivo* screen by intersecting the candidate list with list of genes with heterozygosity (LOH) in human cancer cell lines and breast cancer specimens accessed by high-density short nucleotide polymorphism (SNP) arrays. Therefore, it is reasonable to focus on genes which have genetic alterations in metastatic breast cancer first in a pilot screen.

In the *in vivo* experiment described in Aim 1 of the proposal, the system will allow me to study the dynamic metastatic tumor population in live animals by following both proliferating and dormant metastatic lesion. In order to generate a prioritized candidate gene list, I conducted the following research. Part (1) focuses on candidate MSGs that promote metastasis in general which may function through one or multiple steps during metastasis formation. Part (2) aim to tackle specific set of genes that promote growth of dormant cells.

- (1) To generate a list of putative MSGs basing on literature and tested shRNAs against selected genes

Prior studies have identified several putative MSGs, including ARHGDI1, CDH1, KAI1, CRSP3(MED23), DAB2IP, DNAJB4, EZH2, GAS1, HOXD10, PEBP1, PRDM13 and SETD2. I tested knockdown efficiency of shRNAs against selected putative MSGs in MCF7 breast cancer cell line. Specifically, MCF7 cells were infected with VSV-G pseudotyped lentivirus expressing shRNA against selected putative MSGs. RNA was collected at three and five days after virus infection and the depletion of target was detected by qRT-PCR. The result from day five is shown in Figure 1. For each candidate gene, I have two to three shRNAs which reduce target transcript level more than 50% at day 5 post virus infection. Knocking down these putative MSGs does not affect viability of MCF7 cells at time points tested. I plan to test whether perturbation of these genes in MCF7 cells could enhance its migration and invasion ability in Matrigel transwell assay (BD Biosciences) (described in aim2 of the proposal).

- (2) To generate list of genes that is essential in metastatic breast cancer

Metastatic cancer cells may persist as small asymptomatic microscopic colonies for prolonged periods of time before the eventual outgrowth. These dormant tumor cells are believed to be at least in part responsible for cancer recurrence that can occur decades after apparently successful initial treatment. The survival of

dormant lesions, their eventual activation and outgrowth require additional tumor-intrinsic or tumor-extrinsic factors. Mechanistically, highly metastatic tumor cells may depend on specific set of genes/factors for enhanced growth comparing to primary tumor. Conversely, losing these genes/factors may compromise the growth of metastatic tumor cells specifically. I reason to characterize such set of genes which are essential only in metastatic cells could help us to explain how dormant cells develop into proliferative metastatic lesions.

In order to generate a list of genes specifically essential in metastatic breast cancer, I took advantage of meta-dataset systematically documenting gene essentiality in 201 human cancer cell lines. To have a comprehensive understanding of the molecular vulnerabilities of every type of cancer, the RNAi Consortium at Broad Institute begun an effort to systematically access the essentiality of 11,194 genes in 201 human cancer cell lines by performing genome-scale loss-of-function study. The data from 102 human cancer cell lines is currently publically available.

Briefly, genome-scale, pooled shRNA screens were performed in 201 cancer cell lines, including 13 breast cancer cell lines to identify genes essential for proliferation and survival. Each cell line was infected in quadruplicate with a lentivirally delivered shRNA pool, comprising 54,020 shRNAs targeting 11,194 genes, and propagated for at least 16 population doublings. The abundance of shRNA constructs at the endpoint relative to the initial reference pool was measured by microarray hybridization using a customized array or Illumina sequencing. Genes whose abundances are relatively depleted through the course of experiment are essential to the cancer cell lines.

By integrating these functional data with genetic analysis of primary human tumors and cancer cell lines, they identified known and putative oncogenes, genes involved in response to tumoricidal agents, novel lineage-specific essential genes and genes synthetic lethal to oncogenic KRas mutation[Luo,B., et al., 2008; Cheung,H.W., et al., 2011; Barbie,D.A., et al., 2009].

To identify genes whose essentiality could be associated specifically with metastatic breast cancer, I compared the essentiality of same genes between metastatic vs. non-metastatic breast cancer cell lines and determine a list of genes who are significantly more essential in metastatic breast cancer cell lines. The specific steps I performed are described below:

(2.1) To classify the breast cancer cell lines basing on its metastatic status

To classify breast cancer cell lines basing on its metastatic status, multiple orthogonal approaches can be applied, for example, basing on pathology annotation of cell line source of origin, functionality of cell lines in *in vitro* and *in vivo* metastasis assay and gene expression signature that is associated with metastasis. I adopt a previously established cell line classification using a 70-gene prognostic signature supervised on the metastatic/non-metastatic distinction of 117 primary breast tumors[van'tV., et al., 2002; Kao,J., et al.,

2009]. Patients whose tumor contain 70-gene signature have poor prognosis and prone to have metastasis[van't,V., et al., 2002]. Among 13 breast cancer cell lines, six cell lines are identified to contain the 70-gene signature while another six cell lines are lack of association with this signature (Table 1). The six cell lines with 70-gene signature may be considered to reflect the status of metastatic breast tumor. Given the significant genetic heterogeneity of cancer cell lines, multiple cells lines were used to represent each class of cells in the following comparison.

(2.2) To identify genes are essential specifically in metastatic breast cancer cell lines

To identify genes that are selected to be essential in metastatic breast cancer cell lines, I did the following:

(2.2.1) To analyze the dataset, we converted the results of massively parallel screening of 54,020 individual shRNAs targeting 11,194 genes to quantitative, gene-level scores using the ATARiS algorithm (A.T., D.S, W.C.H and J.M personal communication), which identifies sets of shRNAs with similar behavior across all samples. Thus the gene score derived from ATARiS allows me to compare the gene essentiality quantitatively across the cell lines.

(2.2.2) I used a two-class comparison analysis to detect genes that were significantly more essential for the survival/proliferation of cell lines with 70-gene signature. Two methods were used to perform two-class comparison analysis.

One is basing on weight of evidence (WoE), which computes the likelihood that a given shRNA has the ability to discriminate between the two classes of interest in a statistically significant manner[Cheung,H.W., et al., 2011]. Using a p-value cut off of 0.05, four hundred and forty-five genes were selected (Table 2).

Another one is to identify genes that are correlated with metastatic breast cancer cell lines by their signal-to-noise statistic: $(\text{MEDIAN}_{\text{class(A)}} - \text{MEDIAN}_{\text{class(B)}}) / (\text{STD}_{\text{class(A)}} + \text{STD}_{\text{class(B)}})$, where MEDIAN and STD are the median and standard deviation of the ATARiS value[Luo,B., et al., 2008]. Top 731 genes were selected basing on a signal-to-noise cut off value of -0.5 (Table 3).

A high confidence of list of genes was generated by taking the overlap of the two previous lists (Table 4). I further evaluated biological pathways represented among this candidate list of genes. Go term analysis using GSEA shows enrichment of MAPK activating genes (Table 5). Box plot of ATARiS score of selected MAPK activating genes that are enriched in metastatic cell lines shows the dynamic range of their differential essentiality between two classes of cell lines (Figure 2).

Future plan includes annotate this candidate list further with copy number and gene expression data in the 12 breast cancer cell lines to select list of genes that are both essential and have higher gene expression level or amplification in metastatic breast cancer cell lines. The candidate genes will be tested *in vivo* for their function of supporting metastatic tumor growth.

Breast Cancer Research Training Program

The funding of DoD Breast Cancer Postdoctoral Fellowship has given me tremendous support in the past two years. Couple progresses of me as a breast cancer researcher are listed as below:

- (1) The financial support of DoD fellowship allows me to continue conduct scientific research of my interest and with a goal of benefiting the public.
- (2) I attended the Era of Hope conference last year under the support of DoD fellowship. This conference was a great opportunity for me to get in touch with people conducting high quality of research. It was a fertile experience for me of learning and networking.
- (3) As a scientist trained by the bench side transitionally, I am benefited from working on this proposal through developing my computational biology skills under the guidance of my mentor Dr. William Hahn and Dr. Shirley Liu (Dana Farber Cancer Institute). As more and more large scale functional and genomic dataset becomes available, the skills I am currently developing will not only serve me as a tool to solve my questions but also as a way to generate new hypothesis for me to test. It helps tremendously to build up my foundation as a breast cancer researcher in the future.

Key Research Accomplishments

- Evaluated ASLV-based virus delivery to mouse primary mammary gland tumor
- Generated a list of candidate MSGs genes for pilot screen and tested shRNAs for selected candidate genes

Reportable Outcomes

Not Available

Conclusion

The goal of my research is to identify MSGs in a murine model of metastatic breast cancer. In order to setup a robust system allowing me to perform large-scale gene perturbation *in vivo*, I initiated an ASLV-based lentiviral gene delivery system aiming to deliver virus directly to primary mammary gland tumor in mice. My previous work demonstrated that this gene delivery system efficiently permits gene expression both in

cultured cell lines *in vitro* and in subcutaneous tumor *in vivo*. To test whether this system allows gene delivery to orthotopic tumor, I introduced lentivirus carrying oncogene to mice expressing the virus receptor in mammary gland. However, I failed to observe any mammary gland tumor formation. In the next phase to discover MSGs *in vivo*, I plan to introduce the shRNA library to cell lines *in vitro* then introduce the engineered cell lines *in vivo*. In parallel, I compiled a list of candidate MSGs for pilot screen. These candidate MSGs includes known putative MSGs and genes that are essential for metastatic breast tumor. The candidate genes will be tested both *in vitro* and *in vivo* for their function in migration, invasion and metastasis formation.

Reference

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Appendices

Not Available

Supporting Data

Figure 1: Testing shRNA Knockdown Efficiency of Putative MSGs

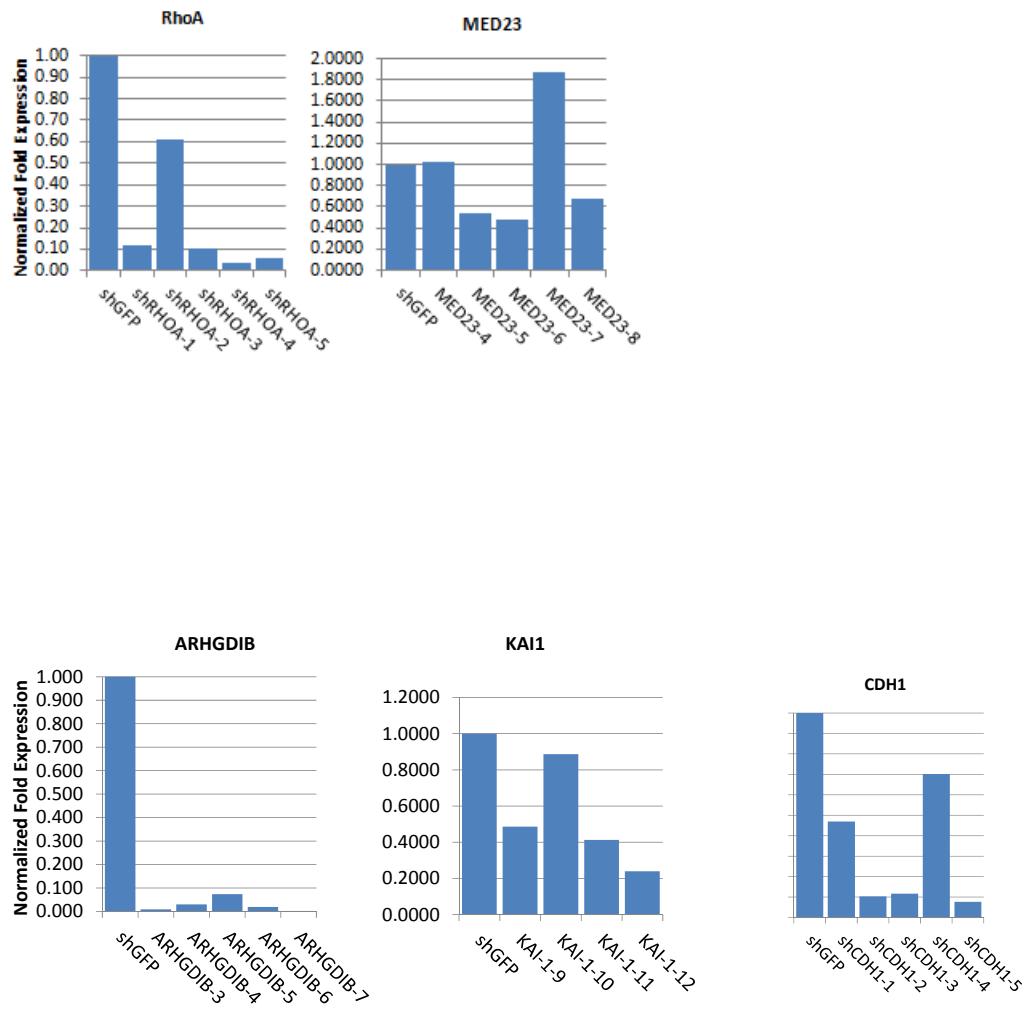
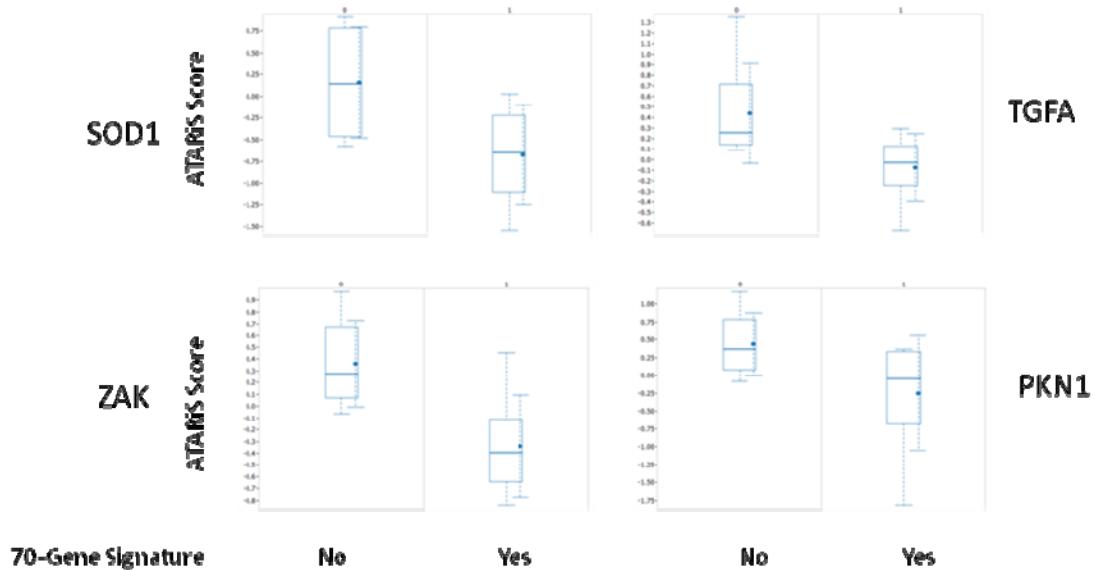


Figure 2: Box Plot of ATARIS Score of Selected Metastatic Essential Genes in Cell Lines with or without 70-Gene Signature



Note: the more negative ATARIS score means the gene is more essential in that cell line

Figure 2 Legend

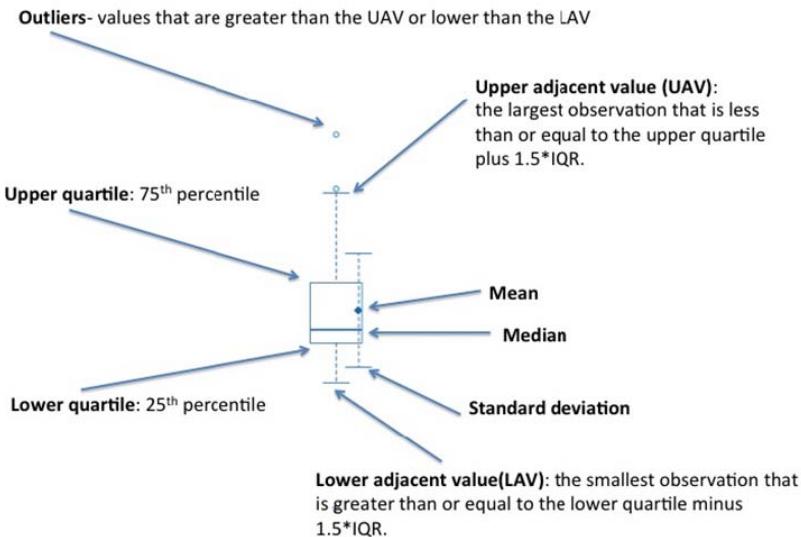


Table 1: Classification of Breast Cancer Cell Lines into Molecular Subtypes

Cell Line	70 Gene	HER2	Subtype	Pathology	KRAS	PIK3CA	BRAF	NRAS	PTEN	APC	CDKN2A	CTNNB1	TP53	STK11	EGFR
BT20	Yes	Negative	ductal Carcinoma	NA	WT	PIK3CA_H1047R, PIK3CA_P539R	WT	WT	WT	WT	WT	WT	TP53_K132Q	WT	WT
BT474	No	Positive	ductal Carcinoma	NA	WT	PIK3CA_K111N	BRAF_V600E	WT	WT	WT	WT	WT	TP53_E285K	WT	WT
CAL120	NA	NA	NA	NA	WT	WT	WT	WT	WT	WT	WT	WT	TP53_?	WT	WT
CAL51	No	Negative	NA	NA	WT	PIK3CA_E542K	WT	WT	WT	WT	WT	WT	NA	WT	WT
EFM19	Yes	Negative	ductal Carcinoma	metastasis	WT	PIK3CA_H1047L	WT	WT	WT	WT	WT	WT	TP53_H193R	WT	WT
HCC1187	Yes	Negative	ductal Carcinoma	NA	WT	WT	WT	WT	WT	WT	WT	WT	WT	WT	WT
HCC1395	Yes	Negative	ductal Carcinoma	NA	WT	WT	WT	WT	PTEN_N212fs*1	WT	WT	WT	TP53_R175H	WT	WT
HCC1954	Yes	Positive	ductal Carcinoma	NA	WT	PIK3CA_H1047R	WT	WT	WT	WT	WT	WT	TP53_Y163C	WT	WT
HCC2218	No	Positive	ductal Carcinoma	NA	WT	WT	WT	WT	WT	WT	WT	WT	TP53_R283C	WT	WT
HCC70	Yes	Negative	ductal Carcinoma	primary	WT	WT	WT	WT	PTEN_F90fs*9	WT	WT	WT	TP53_R248Q	WT	WT
MCF7	No	Negative	Carcinoma	NA	WT	PIK3CA_E545K	WT	WT	WT	WT	WT	WT	WT	WT	WT
MDAMB453	No	NA	Adenocarcinoma	metastasis	WT	PIK3CA_H1047R	WT	WT	WT	WT	WT	WT	WT	WT	WT
ZR7530	No	Positive	ductal Carcinoma	NA	WT	WT	WT	WT	WT	WT	WT	WT	WT	WT	WT

Table 2: List of Candidate Metastatic Essential Gene by WoE

Rank	Gene	Score	Metric: WE	Nominal p-val
1	LOC100508181	-170	-170	0.000111
2	OSTM1	-162	-162	0.000221
3	LOC649330	-140	-140	0.000332
4	SSX1	-126	-126	0.000442
5	INHBA	-107	-107	0.000553
7	LOC100287382	-104	-104	0.000774
6	LOC729468	-104	-104	0.000774
8	NT5C2	-76.7	-76.7	0.000884
9	IARS2	-66.9	-66.9	0.000995
10	FAM108B1	-55.5	-55.5	0.00111
11	SLC4A1	-54.9	-54.9	0.00122
12	ZBTB32	-53.5	-53.5	0.00133
13	PRMT1	-48.8	-48.8	0.00144
14	LUC7L2	-45.9	-45.9	0.00155
15	SPOCK1	-43.3	-43.3	0.00166
16	DCTN4	-28.8	-28.8	0.00177
17	PTPRJ	-21.4	-21.4	0.00188
18	WIF1	-13.2	-13.2	0.00199
19	NUP107	-12.7	-12.7	0.0021
20	GZMB	-10.9	-10.9	0.00221
21	PPP1R10	-8.78	-8.78	0.00232
22	NR0B2	-7.13	-7.13	0.00243
23	THBS2	-7.07	-7.07	0.00254
24	TMEM33	-6.76	-6.76	0.00265
25	GUCY1B2	-6.46	-6.46	0.00276
26	PRSS55	-5.93	-5.93	0.00287
28	HNRNPA3P1	-5.75	-5.75	0.00309
27	ADPGK	-5.75	-7.75	0.00309
29	TP53BP1	-5.68	-5.68	0.00321
30	HNRNPH1	-5.38	-5.38	0.00332
31	TNFSF10	-5.33	-5.33	0.00343
32	OR2T10	-5.1	-5.1	0.00354
33	KCNK2	-4.99	-5.39	0.00365
34	ALDOA	-4.66	-4.66	0.00376
35	BCL2	-4.62	-4.62	0.00387
36	PHTF2	-4.57	-4.57	0.00398
37	MTHFD1L	-4.51	-4.51	0.00409
38	ZNF628	-3.94	-3.94	0.0042
39	SMAD9	-3.78	-3.78	0.00431
40	FGF9	-3.77	-3.77	0.00442
41	PVRL4	-3.63	-3.63	0.00453
42	CNTNAP1	-3.58	-3.58	0.00464
43	RGS1	-3.47	-3.47	0.00475
44	TNK1	-3.34	-3.34	0.00486

45	ZFP112	-3.3	-3.3	0.00497
47	RFK	-3.29	-3.29	0.0052
46	ACVR2B	-3.29	-3.29	0.0052
48	S100B	-3.25	-3.25	0.00531
49	ELAC1	-3.24	-3.24	0.00542
50	SPI1	-3.2	-3.2	0.00553
52	CALM3	-3.16	-3.2	0.00575
51	BCAS2	-3.16	-3.16	0.00575
53	KHDRBS2	-3.13	-3.8	0.00586
54	ATP5G3	-3.06	-3.06	0.00597
55	GRIK4	-3.03	-3.03	0.00608
56	TGFA	-3.02	-3.02	0.00619
57	ZNF347	-3.01	-3.06	0.0063
58	HNRNPA3	-2.97	-2.97	0.00641
59	CHN2	-2.95	-2.95	0.00652
60	ATP6AP2	-2.86	-2.86	0.00663
62	CD55	-2.81	-3.45	0.00685
61	C5orf32	-2.81	-2.81	0.00685
63	IRS2	-2.8	-2.8	0.00696
64	RNASE4	-2.79	-2.79	0.00707
66	ZFP36L1	-2.78	-2.78	0.0073
65	FGF10	-2.78	-4.26	0.0073
67	BBS7	-2.77	-2.77	0.00741
68	SFTPC	-2.76	-2.76	0.00752
69	STMN3	-2.74	-2.74	0.00763
70	PIK3CB	-2.73	-2.73	0.00774
71	NDN	-2.69	-2.69	0.00785
72	CDKL3	-2.66	-2.66	0.00796
73	MKKS	-2.65	-2.65	0.00807
75	QPRT	-2.61	-2.63	0.00829
74	MTMR1	-2.61	-2.81	0.00829
76	SIK3	-2.6	-2.6	0.0084
77	FCGR2C	-2.58	-2.58	0.00851
78	MPP1	-2.56	-2.56	0.00862
79	KRT16	-2.55	-2.55	0.00873
81	CYP4F3	-2.54	-2.79	0.00895
80	OR6K6	-2.54	-2.69	0.00895
83	NFATC1	-2.51	-2.85	0.00917
82	JAK1	-2.51	-2.51	0.00917
84	PLBD2	-2.49	-2.49	0.00928
85	OR1E1	-2.48	-2.48	0.0094
89	OR1E2	-2.46	-2.46	0.00984
88	CCKBR	-2.46	-2.46	0.00984
87	TDGF1P3	-2.46	-2.46	0.00984
86	SORCS3	-2.46	-2.46	0.00984
91	LOXL4	-2.45	-2.45	0.0101
90	DEK	-2.45	-2.45	0.0101

92	KCNA2	-2.43	-2.43	0.0102
94	ACTG2	-2.42	-2.42	0.0104
93	MED7	-2.42	-2.42	0.0104
96	CHST2	-2.41	-2.41	0.0106
95	PTPN13	-2.41	-2.41	0.0106
98	NCSTN	-2.39	-2.39	0.0108
97	GIMAP4	-2.39	-2.39	0.0108
99	ARHGAP23	-2.38	-2.38	0.0109
100	HLA-DPA1	-2.37	-2.37	0.0111
101	WDSUB1	-2.36	-2.36	0.0112
102	KCTD3	-2.35	-3.03	0.0113
104	SPACA5B	-2.33	-2.33	0.0115
103	SPACA5	-2.33	-2.33	0.0115
106	OR1E1	-2.31	-2.31	0.0117
105	CPPED1	-2.31	-2.31	0.0117
107	LOC100507699	-2.3	-2.3	0.0118
108	ISCU	-2.28	-2.28	0.0119
112	GMIP	-2.26	-2.26	0.0124
111	HEYL	-2.26	-2.26	0.0124
110	LOC646096	-2.26	-2.26	0.0124
109	FCGR2A	-2.26	-2.26	0.0124
113	STS	-2.25	-2.56	0.0125
117	BMP2K	-2.22	-2.27	0.0129
116	TSSK3	-2.22	-2.22	0.0129
115	EIF2AK3	-2.22	-2.44	0.0129
114	HS2ST1	-2.22	-2.22	0.0129
119	ETAA1	-2.19	-2.19	0.0132
118	HAS2	-2.19	-2.19	0.0132
120	PKNOX2	-2.18	-2.18	0.0133
122	RBX1	-2.15	-2.15	0.0135
121	MAP3K7	-2.15	-2.15	0.0135
123	SLC25A4	-2.14	-2.14	0.0136
126	TRIM43B	-2.13	-2.13	0.0139
125	TRIM43	-2.13	-2.13	0.0139
124	TRAIP	-2.13	-2.13	0.0139
127	COL9A1	-2.12	-2.12	0.014
128	SACM1L	-2.11	-2.11	0.0141
129	LYN	-2.1	-2.1	0.0143
130	ANK3	-2.09	-2.86	0.0144
131	KCNH2	-2.08	-2.14	0.0145
132	JUB	-2.05	-3.23	0.0146
133	BIK	-2.04	-2.04	0.0147
134	SGPP2	-2.03	-2.03	0.0148
135	ZNF667	-2.01	-2.01	0.0149
136	ZAK	-2	-2	0.015
137	SERPINA4	-1.99	-1.99	0.0151
140	MYO3B	-1.98	-1.98	0.0155

139	HSFY2	-1.98	-1.98	0.0155
138	HSFY1	-1.98	-1.98	0.0155
141	POFUT2	-1.96	-1.96	0.0156
143	PROCR	-1.95	-1.95	0.0158
142	RFX5	-1.95	-2	0.0158
146	FXYD6-FXYD2	-1.94	-1.94	0.0161
145	ADAM28	-1.94	-1.94	0.0161
144	ROBO1	-1.94	-1.94	0.0161
147	NLRP12	-1.93	-1.93	0.0162
148	SMARCAD1	-1.92	-2.55	0.0164
149	RDH8	-1.91	-1.91	0.0165
151	CDX1	-1.9	-1.9	0.0167
150	MAPK1	-1.9	-1.9	0.0167
152	PRDM9	-1.89	-1.89	0.0168
154	CIB3	-1.88	-1.88	0.017
153	GEM	-1.88	-1.88	0.017
158	AK4	-1.87	-1.87	0.0175
157	ZNF514	-1.87	-1.87	0.0175
156	FBXO6	-1.87	-1.87	0.0175
155	SEMA6C	-1.87	-1.87	0.0175
160	GNAT2	-1.86	-1.86	0.0177
159	ADAM7	-1.86	-1.86	0.0177
161	ALKBH3	-1.85	-1.85	0.0178
164	NCOA5	-1.84	-2.23	0.0181
163	TRPM5	-1.84	-2.21	0.0181
162	C12orf52	-1.84	-1.84	0.0181
166	WWOX	-1.83	-1.83	0.0183
165	RXFP1	-1.83	-1.83	0.0183
168	MEP1B	-1.82	-1.82	0.0186
167	GNMT	-1.82	-1.82	0.0186
169	PRKAR1A	-1.81	-1.81	0.0187
172	SLC4A2	-1.8	-1.8	0.019
171	CD96	-1.8	-1.8	0.019
170	MEIS3	-1.8	-1.8	0.019
174	IL17A	-1.78	-1.78	0.0192
173	RMND5A	-1.78	-1.78	0.0192
176	OSGEPL1	-1.77	-1.77	0.0195
175	NACAP1	-1.77	-1.77	0.0195
179	CYP3A4	-1.76	-1.76	0.0198
178	HIPK1	-1.76	-1.76	0.0198
177	NPAS1	-1.76	-1.76	0.0198
180	AOC3	-1.75	-1.75	0.0199
181	COL4A2	-1.74	-1.74	0.02
182	SIX4	-1.73	-1.73	0.0201
184	ZNF438	-1.72	-1.72	0.0203
183	ZNF780B	-1.72	-1.72	0.0203
187	SSH3	-1.71	-1.71	0.0207

186	STRADA	-1.71	-1.71	0.0207
185	PMF1	-1.71	-1.71	0.0207
188	MAT2A	-1.7	-1.7	0.0208
190	CDHR5	-1.69	-1.93	0.021
189	SPINLW1	-1.69	-1.69	0.021
192	ATP13A1	-1.68	-1.73	0.0212
191	SPRED1	-1.68	-1.68	0.0212
195	NAALAD2	-1.67	-1.67	0.0216
194	SELPLG	-1.67	-1.67	0.0216
193	TRAM1	-1.67	-1.67	0.0216
199	TAF1B	-1.66	-1.66	0.022
198	FLG2	-1.66	-1.66	0.022
197	SKIV2L2	-1.66	-1.66	0.022
196	SCUBE3	-1.66	-1.66	0.022
207	RBL1	-1.65	-1.65	0.0229
206	PHF13	-1.65	-1.65	0.0229
205	PRSS42	-1.65	-1.65	0.0229
204	LONRF3	-1.65	-1.65	0.0229
203	TET1	-1.65	-1.89	0.0229
202	TRIM48	-1.65	-1.65	0.0229
201	PKN1	-1.65	-1.65	0.0229
200	ATP6V1B2	-1.65	-1.65	0.0229
208	TIAL1	-1.64	-1.64	0.023
211	SLC7A11	-1.63	-1.69	0.0233
210	ACMSD	-1.63	-1.63	0.0233
209	RNF8	-1.63	-1.63	0.0233
212	S100A8	-1.62	-1.62	0.0234
216	PFDN1	-1.61	-1.61	0.0239
215	ZNF37A	-1.61	-1.61	0.0239
214	DLK1	-1.61	-1.61	0.0239
213	SERPINA1	-1.61	-1.61	0.0239
220	PAPD5	-1.6	-1.6	0.0243
219	LMBRD1	-1.6	-2.05	0.0243
218	SIM2	-1.6	-1.6	0.0243
217	LEP	-1.6	-1.6	0.0243
222	ZNF653	-1.59	-2.14	0.0245
221	ZCCHC14	-1.59	-1.59	0.0245
226	BBS4	-1.58	-1.58	0.025
225	RAB3GAP2	-1.58	-2.06	0.025
224	10-Mar	-1.58	-1.58	0.025
223	HELLS	-1.58	-1.58	0.025
229	WFDC12	-1.57	-1.57	0.0253
228	TNFAIP8	-1.57	-1.57	0.0253
227	CES1P1	-1.57	-1.57	0.0253
235	IDH2	-1.56	-1.56	0.026
234	BCL9	-1.56	-1.56	0.026
233	OBP2A	-1.56	-1.56	0.026

232	MKX	-1.56	-1.56	0.026
231	DDX5	-1.56	-1.56	0.026
230	LACTB	-1.56	-1.56	0.026
238	GLRX2	-1.55	-1.55	0.0263
237	TNRC6C	-1.55	-2.12	0.0263
236	NKX2-1	-1.55	-1.55	0.0263
242	FETUB	-1.54	-1.54	0.0267
241	ZNF222	-1.54	-1.54	0.0267
240	UCK1	-1.54	-1.54	0.0267
239	TBC1D9B	-1.54	-1.54	0.0267
246	SP110	-1.53	-1.78	0.0272
245	ACRBP	-1.53	-1.53	0.0272
244	GALC	-1.53	-1.53	0.0272
243	DNAJB6	-1.53	-1.53	0.0272
249	CC2D1A	-1.52	-1.52	0.0275
248	MAP3K1	-1.52	-1.9	0.0275
247	PON1	-1.52	-1.52	0.0275
252	EFCAB1	-1.51	-2.15	0.0279
251	ZNF182	-1.51	-1.51	0.0279
250	SLC38A2	-1.51	-1.51	0.0279
255	BBOX1	-1.5	-1.62	0.0282
254	PIK3R6	-1.5	-1.5	0.0282
253	PCDHA13	-1.5	-1.5	0.0282
259	SFXN2	-1.49	-1.49	0.0286
258	ARFGAP3	-1.49	-1.49	0.0286
257	APEH	-1.49	-1.53	0.0286
256	DIS3	-1.49	-1.49	0.0286
262	LAMA2	-1.48	-1.48	0.029
261	CLK2P	-1.48	-1.48	0.029
260	ZBTB39	-1.48	-1.48	0.029
268	METTL4	-1.47	-1.47	0.0296
267	ILKAP	-1.47	-1.47	0.0296
266	TSLP	-1.47	-1.47	0.0296
265	SLC5A12	-1.47	-1.47	0.0296
264	CUL2	-1.47	-1.47	0.0296
263	LEPREL2	-1.47	-1.47	0.0296
272	S1PR2	-1.46	-1.46	0.0301
271	DLG2	-1.46	-1.62	0.0301
270	CNTF	-1.46	-1.46	0.0301
269	ACADS	-1.46	-1.46	0.0301
278	ADRA1A	-1.45	-1.45	0.0307
277	N6AMT1	-1.45	-1.45	0.0307
276	THEM5	-1.45	-1.45	0.0307
275	DLX6	-1.45	-1.45	0.0307
274	SOD1	-1.45	-1.45	0.0307
273	MAT1A	-1.45	-1.45	0.0307
281	ZNF645	-1.44	-1.44	0.0311

280	ZNF85	-1.44	-1.44	0.0311
279	SFTPA1	-1.44	-1.44	0.0311
285	PRKAG1	-1.43	-1.43	0.0315
284	RASL11B	-1.43	-1.43	0.0315
283	SUGT1	-1.43	-1.43	0.0315
282	ZNF611	-1.43	-1.43	0.0315
289	OR6V1	-1.42	-1.42	0.0319
288	HDAC3	-1.42	-1.91	0.0319
287	DCX	-1.42	-1.42	0.0319
286	GLP2R	-1.42	-1.42	0.0319
294	SLC35C2	-1.41	-1.41	0.0325
293	FZD3	-1.41	-1.65	0.0325
292	ZNF484	-1.41	-1.41	0.0325
291	HDAC2	-1.41	-1.41	0.0325
290	RAVER1	-1.41	-1.41	0.0325
304	PKM2	-1.4	-1.4	0.0336
303	LOC652797	-1.4	-1.4	0.0336
302	LGALS3	-1.4	-1.45	0.0336
301	IL22	-1.4	-1.59	0.0336
300	NFE2L2	-1.4	-1.4	0.0336
299	GRIA1	-1.4	-1.42	0.0336
298	RBM26	-1.4	-1.4	0.0336
297	SLC28A2	-1.4	-1.6	0.0336
296	CTBP2	-1.4	-1.4	0.0336
295	SLA	-1.4	-1.4	0.0336
312	STX3	-1.39	-1.39	0.0345
311	FSHR	-1.39	-1.39	0.0345
310	RNF121	-1.39	-1.39	0.0345
309	POLR2H	-1.39	-1.39	0.0345
308	EFEMP1	-1.39	-1.39	0.0345
307	FAM18A	-1.39	-1.39	0.0345
306	GPR15	-1.39	-1.39	0.0345
305	RNF11	-1.39	-1.39	0.0345
318	INVS	-1.38	-1.49	0.0351
317	PHLPP1	-1.38	-1.42	0.0351
316	RCAN1	-1.38	-1.38	0.0351
315	CAPN1	-1.38	-1.38	0.0351
314	CEACAM6	-1.38	-1.38	0.0351
313	METAP1	-1.38	-1.38	0.0351
321	ADORA2B	-1.37	-1.37	0.0355
320	ABCC3	-1.37	-1.37	0.0355
319	PCDHA13	-1.37	-1.37	0.0355
324	CAPN5	-1.36	-1.36	0.0358
323	SCG3	-1.36	-1.36	0.0358
322	NBEA	-1.36	-1.36	0.0358
329	BMP6	-1.35	-1.35	0.0364
328	GATA1	-1.35	-1.35	0.0364

327	IL21R	-1.35	-1.35	0.0364
326	FBXW11	-1.35	-1.35	0.0364
325	USP21	-1.35	-1.35	0.0364
337	TIE1	-1.34	-1.34	0.0372
336	AMY2A	-1.34	-1.47	0.0372
335	HRSP12	-1.34	-1.46	0.0372
334	TAL1	-1.34	-1.34	0.0372
333	CDC42BPB	-1.34	-1.34	0.0372
332	CAMK1D	-1.34	-1.34	0.0372
331	BCL9	-1.34	-1.34	0.0372
330	HAAO	-1.34	-1.34	0.0372
342	ZNF76	-1.33	-1.33	0.0378
341	MATR3	-1.33	-1.33	0.0378
340	MXD4	-1.33	-1.33	0.0378
339	PCSK1	-1.33	-1.33	0.0378
338	ZSCAN4	-1.33	-1.33	0.0378
347	NHP2L1	-1.32	-1.32	0.0384
346	PC	-1.32	-1.32	0.0384
345	PRDM2	-1.32	-1.32	0.0384
344	HIST1H2BB	-1.32	-1.67	0.0384
343	CNOT8	-1.32	-1.32	0.0384
353	LOC440563	-1.31	-1.31	0.039
352	TRPT1	-1.31	-1.91	0.039
351	RSC1A1	-1.31	-1.36	0.039
350	DNAJC27	-1.31	-1.31	0.039
349	SLC6A8	-1.31	-1.31	0.039
348	ZNF585A	-1.31	-1.31	0.039
364	NINL	-1.3	-1.3	0.0402
363	GLUL	-1.3	-1.3	0.0402
362	LOC100507804	-1.3	-1.3	0.0402
361	SIRPG	-1.3	-1.3	0.0402
360	SLC41A1	-1.3	-1.3	0.0402
359	RDX	-1.3	-1.3	0.0402
358	GLUD1	-1.3	-1.3	0.0402
357	TGFBR1	-1.3	-1.3	0.0402
356	CLEC3A	-1.3	-1.3	0.0402
355	ITGA3	-1.3	-1.51	0.0402
354	GPR39	-1.3	-1.3	0.0402
369	PGM2	-1.29	-1.29	0.0408
368	CDH7	-1.29	-1.29	0.0408
367	PSIP1	-1.29	-1.29	0.0408
366	S100A14	-1.29	-1.29	0.0408
365	PZP	-1.29	-1.58	0.0408
376	BUB1	-1.28	-1.28	0.0416
375	ZNF585B	-1.28	-1.6	0.0416
374	DOCK2	-1.28	-1.28	0.0416
373	ZNF524	-1.28	-1.28	0.0416

372	UGT1A3	-1.28	-1.28	0.0416
371	GYS1	-1.28	-1.28	0.0416
370	SOCS5	-1.28	-1.28	0.0416
385	FOS	-1.27	-1.27	0.0426
384	PPIL3	-1.27	-1.27	0.0426
383	PRDM7	-1.27	-1.27	0.0426
382	ACOT11	-1.27	-1.43	0.0426
381	CCRL1	-1.27	-1.27	0.0426
380	PRMT8	-1.27	-1.27	0.0426
379	OSCAR	-1.27	-1.27	0.0426
378	LHX8	-1.27	-1.27	0.0426
377	ROBO3	-1.27	-1.27	0.0426
393	COBL	-1.26	-1.26	0.0434
392	OR1E2	-1.26	-1.26	0.0434
391	UBE2Q1	-1.26	-1.26	0.0434
390	LDHC	-1.26	-1.76	0.0434
389	THOC3	-1.26	-1.26	0.0434
388	LOC728554	-1.26	-1.26	0.0434
387	DPCR1	-1.26	-1.28	0.0434
386	ZFP91-CNTF	-1.26	-1.26	0.0434
399	CTRL	-1.25	-1.25	0.0441
398	UBE2G2	-1.25	-1.25	0.0441
397	ETV1	-1.25	-1.25	0.0441
396	PDP1	-1.25	-1.25	0.0441
395	YKT6	-1.25	-1.25	0.0441
394	REM2	-1.25	-1.25	0.0441
405	SLC27A2	-1.24	-1.24	0.0448
404	SNRPF	-1.24	-1.24	0.0448
403	MS4A1	-1.24	-1.65	0.0448
402	SEC23A	-1.24	-1.24	0.0448
401	POLL	-1.24	-1.24	0.0448
400	SNRPA	-1.24	-1.24	0.0448
413	SLC17A4	-1.23	-1.23	0.0457
412	ALG10	-1.23	-1.23	0.0457
411	LOC100290936	-1.23	-1.23	0.0457
410	UGT1A7	-1.23	-1.23	0.0457
409	MED27	-1.23	-1.23	0.0457
408	CRSP8P	-1.23	-1.23	0.0457
407	BHLHE41	-1.23	-1.23	0.0457
406	MC5R	-1.23	-1.23	0.0457
421	LENG1	-1.22	-1.3	0.0465
420	ENOX2	-1.22	-1.22	0.0465
419	GPR148	-1.22	-2.14	0.0465
418	GPR179	-1.22	-1.22	0.0465
417	APOB	-1.22	-1.22	0.0465
416	BCO2	-1.22	-1.22	0.0465
415	Luciferase	-1.22	-1.31	0.0465

414	CSN3	-1.22	-1.22	0.0465
426	HLA-DRB5	-1.21	-1.56	0.0471
425	ST6GALNAC6	-1.21	-1.21	0.0471
424	A4GALT	-1.21	-1.21	0.0471
423	HSD17B7	-1.21	-1.21	0.0471
422	RALY	-1.21	-1.21	0.0471
434	OPN4	-1.2	-1.2	0.048
433	RARS2	-1.2	-1.22	0.048
432	TAF1L	-1.2	-1.2	0.048
431	ZNF813	-1.2	-1.2	0.048
430	DDI2	-1.2	-1.32	0.048
429	CALCRL	-1.2	-1.27	0.048
428	AGTR1	-1.2	-1.2	0.048
427	DDX59	-1.2	-1.2	0.048
439	RAB4B-EGLN2	-1.19	-1.19	0.0485
438	CUTC	-1.19	-1.2	0.0485
437	WISP1	-1.19	-1.19	0.0485
436	UBR2	-1.19	-1.19	0.0485
435	BBX	-1.19	-1.19	0.0485
444	OR2AT4	-1.18	-1.18	0.0491
443	ZBTB22	-1.18	-1.18	0.0491
442	ZNF286A	-1.18	-1.18	0.0491
441	LMBR1	-1.18	-1.18	0.0491
440	CLCA4	-1.18	-1.74	0.0491
448	MUSK	-1.17	-1.17	0.0495
447	RARA	-1.17	-1.17	0.0495
446	AGAP7	-1.17	-1.17	0.0495
445	MATN3	-1.17	-1.27	0.0495

Table 3: List of Candidate Metastatic Essential Gene by Signal-to-noise Statistic

Cell Line Name		BT20	EFM19	HCC1187	HCC1395	HCC1954	HCC70	BT474	CAL51	HCC2218	MCF7	MDAMB453	ZR7530
70-Gene Signature		Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No
Gene Name	Signal-to-noise Score	ATARiS Score											
DCTN4	-2.2624	-0.318	-0.4936	-0.302	-0.2737	-0.3772	-0.5605	0.09909	0.1799	-0.02289	0.03791	0.05991	-0.03345
ZBTB32	-2.0071	-0.2583	-0.5856	-0.2289	-0.06078	-0.02804	0.01365	0.8407	0.368	1.0883	1.1047	0.6816	1.1615
NT5C2	-1.6755	-0.1696	-0.07164	-0.06334	-0.2341	-0.329	-0.08523	0.1039	0.6883	0.9598	0.6816	0.4009	0.3477
FAM108B1	-1.4587	0.02436	-0.7113	-0.2887	-0.1976	-0.642	-0.2231	0.395	0.1796	0.8664	0.6361	0.4263	0.2133
RFK	-1.3948	-0.2018	-0.2454	-0.3741	-0.1261	-0.03628	0.2843	0.2219	0.3156	0.3571	0.3891	0.3948	0.2081
OSTM1	-1.3921	-0.3141	-0.9178	-0.1645	-0.5739	-0.609	-0.2478	0.7982	1.0991	0.2714	0.5404	-0.08168	0.3627
PVRL4	-1.3893	-0.5309	-0.1334	-0.1419	0.000791	0.008157	0.4624	0.9066	0.8232	0.6386	0.9186	0.6391	0.3161
LOC100508181	-1.3628	-0.377	-0.2222	-0.7817	-0.4498	-0.8929	-0.1806	-0.09554	0.5338	0.3572	0.6689	0.455	1.3007
PHTF2	-1.3514	-0.7464	-0.8072	-1.1498	-1.0324	-0.1776	-0.7285	0.5249	0.9114	-0.1641	0.4402	-0.2717	0.2513
WIF1	-1.304	-0.1702	-0.2403	-0.2197	-0.2732	-0.6575	-0.4135	1.1143	1.5252	0.6988	0.2255	1.3606	-0.2011
TP53BP1	-1.288	-0.1846	-0.5797	-0.2311	-0.8134	-0.4119	-1.1359	0.2287	0.7956	0.8082	0.9954	-0.2576	1.356
S100B	-1.2815	-0.08959	0.1526	-0.4528	-0.575	-0.8274	-0.3823	0.4518	0.5197	0.3886	0.7411	0.5052	-0.05845
SLC4A1	-1.2788	-0.00511	-0.555	-0.6021	-0.04958	-0.02566	-0.7011	0.6929	0.5044	0.2312	1.3352	0.3757	0.4478
LOC100287382	-1.2613	-0.3308	-0.839	-0.4706	-0.3261	-0.7016	-0.3466	-0.09612	0.8371	0.4843	-0.2486	1.1318	1.2009
LOC729468	-1.2613	-0.3308	-0.839	-0.4706	-0.3261	-0.7016	-0.3466	-0.09612	0.8371	0.4843	-0.2486	1.1318	1.2009
IARS2	-1.2509	-0.05346	0.06541	0.4868	-1.0062	-0.3682	-1.0901	0.6326	0.9987	0.6422	0.504	0.9302	0.5442
ATP5G3	-1.2468	-0.8917	1.2115	-0.6805	-0.3316	-0.8658	0.3118	1.5166	0.8323	1.4779	1.8681	1.1969	0.952
RGS1	-1.2252	-0.03815	-0.4062	0.141	-0.3341	0.04471	0.2495	1.1098	0.07418	0.8325	1.2625	0.9447	0.5298
LUC7L2	-1.2211	-1.4671	-0.549	-1.6618	-0.692	-1.0385	-0.6638	-0.2341	-0.3331	0.09799	-0.2362	0.5445	-0.1364
CALM3	-1.2158	0.1407	0.5725	0.1133	-0.4799	-0.3698	-0.08024	2.1174	0.2159	1.2258	0.9093	1.4326	1.3774
BCAS2	-1.2067	0.1384	-0.4195	-0.1391	-0.4953	-0.3784	-0.2387	0.4289	0.1672	0.571	0.394	0.172	-0.02049
GZMB	-1.1813	0.06754	-0.4567	-0.2928	-0.732	-0.7981	-0.2524	0.4427	0.8883	0.07665	0.05294	0.1516	0.5272
CD55	-1.1711	0.09329	0.2052	0.0833	0.6462	-0.67	0.1478	0.9077	0.8461	0.4733	0.8587	0.7133	0.8043
PTPRJ	-1.142	-0.2062	-0.5638	-0.4748	-0.7498	-0.4758	-0.255	-0.2148	0.8215	0.6478	0.2922	0.1362	-0.1566
C5orf32	-1.1371	-0.3591	-0.579	-0.2549	-0.2004	-0.1023	-0.5074	-0.3285	0.4403	0.1733	0.2867	0.8766	0.6227
MED7	-1.1343	-0.6802	-0.6569	0.5217	-0.143	-0.3669	-0.7093	0.9398	-0.1106	1.06	0.4999	1.421	1.1018
HNRNPH1	-1.1174	-0.2305	-0.5734	0.2215	-0.0224	-0.5414	-0.9525	0.224	0.3902	0.6846	0.7473	0.1371	0.2589
FGF10	-1.1106	0.2459	0.6287	-0.3492	0.1717	0.4935	0.3517	0.9904	0.685	0.5333	0.9329	0.9828	0.9654
ALDOA	-1.1074	-0.2787	-0.07435	-0.711	-0.2363	-0.5584	-0.8404	-0.03431	0.05221	0.08522	-0.1594	0.302	0.05592
SPOCK1	-1.0676	0.3131	0.3557	-0.06346	-0.3052	-0.4793	-0.5039	0.3763	0.5754	0.9232	0.88	1.6092	0.3783
MPP1	-1.0603	-0.5978	0.2773	0.02013	-0.02638	-0.2616	-0.1441	0.4018	-0.06545	1.0462	0.6627	0.898	0.7296
ZNF628	-1.0563	-0.4923	0.2394	-1.118	-0.2734	-0.4175	-0.5068	0.6386	0.1438	0.1536	1.1882	0.4705	0.189
TNK1	-1.0537	0.2132	-0.5604	-0.01147	-0.2994	-0.7978	-0.1586	0.7894	-0.03349	0.4538	1.2535	0.5806	0.3883
THBS2	-1.0412	-0.1867	0.497	0.2514	-0.9225	-0.7343	0.413	0.9049	0.7682	1.7451	1.4029	0.8286	0.4262

LOC649330	-1.0376	0.152	0.1061	-0.6511	0.3264	-0.9751	0.2559	0.38	0.4463	1.1044	0.714	0.8183	0.7872
QPRT	-1.0368	-0.0355	0.633	0.1523	-0.1402	-0.00864	-0.6937	0.4527	0.3899	0.7881	0.6249	0.7883	0.572
BCL2	-1.0297	-0.02005	-0.1732	-1.0036	-0.5859	-1.2245	-0.4009	0.07825	-0.123	0.4698	0.2207	0.3183	-0.06018
KHDRBS2	-1.0285	-0.159	0.4294	0.52	-0.1529	-0.1827	0.312	0.4349	0.6545	0.9413	0.7556	0.97	0.4554
SPACA5B	-1.0212	-0.2272	0.2335	-0.3711	-0.2251	-0.01164	-0.3672	0.7953	0.3835	0.4754	-0.07964	0.6019	0.1841
SPACAS	-1.0212	-0.2272	0.2335	-0.3711	-0.2251	-0.01164	-0.3672	0.7953	0.3835	0.4754	-0.07964	0.6019	0.1841
STS	-1.0166	-0.2496	0.3639	0.06765	-0.2398	0.2402	0.3594	1.1138	0.9974	0.1336	0.7811	1.2827	0.5227
OR1E2	-1.0112	-0.3545	-1.0026	-0.3919	-0.469	0.3651	-0.5699	0.1136	0.8556	0.2822	0.9296	-0.03069	0.4975
ELAC1	-1.0111	-0.429	0.2961	0.002348	-0.1516	-0.2352	0.2474	0.1466	0.8395	0.3581	0.5056	0.5294	1.0558
IRS2	-1.01	-0.25	-0.07062	0.1095	0.3364	-0.536	-0.4052	0.1898	0.7247	0.9558	0.1394	0.8794	0.4104
MTHFD1L	-1.0092	-0.08922	-0.3717	-0.4063	0.4791	-0.1318	0.1866	1.6859	0.3567	1.2365	0.6359	0.5859	0.4132
STMN3	-1.0085	-0.6944	-0.4611	0.2687	0.2725	-0.3095	0.07688	1.2688	0.1119	0.8019	1.017	0.9069	0.2444
HNRNPA3P1	-1.0062	-0.4412	-0.7012	-0.6582	-0.4444	-0.3759	-0.8464	0.333	-0.2111	0.4616	0.5911	-0.4539	-0.3452
DEK	-1.0058	0.04381	-0.6619	-0.3711	-0.5309	-0.6584	-0.3157	0.1017	0.03372	0.3299	0.7416	0.3409	-0.3044
GIMAP4	-1.0043	0.09524	-0.4198	-0.3343	0.4586	-0.7514	-0.06557	0.7257	0.7721	0.1017	0.6474	0.9131	0.2776
OR2T10	-1.0022	-1.2949	-0.5235	-0.1998	-1.2162	-0.3228	-1.1919	-0.2586	-0.2665	0.1982	-0.04531	-0.2483	-0.02238
ETAA1	-1.0015	-0.5055	0.552	-0.2278	-0.5381	-0.5482	-0.4341	0.8744	0.2753	0.4249	-0.03604	1.2434	1.0269
LOXL4	-0.9973	-0.4178	0.1593	-0.4147	-0.1708	-0.3341	0.09472	0.5006	0.007777	0.2968	0.3461	0.2397	0.1044
ATP6AP2	-0.9972	-0.438	-0.2838	0.2288	-0.4908	-0.1397	-0.5741	0.03743	1.0194	0.1981	0.0126	0.9313	0.5245
BMP2K	-0.9933	-0.2447	0.6884	0.02093	-0.2612	-0.1494	0.1028	0.6572	1.2514	0.2855	0.4457	0.7464	1.0541
INHBA	-0.9906	-0.5492	0.04904	0.05972	0.002176	-0.6477	-1.0968	0.1963	0.05847	1.9354	1.6573	0.4315	1.0412
SIK3	-0.9899	0.2218	-0.1492	-0.6755	0.008296	-0.7441	0.02186	0.6332	-0.1987	0.9175	1.2276	0.5774	1.6632
ZNF653	-0.9878	0.3144	-0.00264	-0.00115	0.1078	0.8533	-0.071	1.2267	0.2327	1.1145	1.0206	1.694	0.8287
MKKS	-0.9871	-0.1508	0.09938	-1.164	-0.3427	0.7237	0.1077	1.8592	0.1511	0.5517	1.34	2.236	1.5065
NCOA5	-0.9866	-0.3437	0.5561	-0.05456	1.0158	0.04703	-0.1564	1.2714	0.4207	1.2063	1.2374	0.8925	1.8525
PRSS55	-0.9858	-0.3062	-0.5494	-0.7738	-0.4992	-0.5374	-0.3053	-0.3332	0.264	-0.2366	-0.1013	0.04535	-0.2505
KCNK2	-0.9663	0.3908	0.18	-0.3399	-0.1441	0.3333	-0.2186	0.3178	0.4927	0.5844	1.2937	0.6073	0.6235
HEYL	-0.9643	-0.5797	-0.3529	0.2138	-0.6252	-0.5289	-0.1681	0.233	0.02687	0.00844	0.001798	0.2284	0.5584
SLC25A4	-0.9562	-0.3882	0.366	-1.1156	-0.7018	-0.9633	0.2647	0.329	0.5186	0.1567	0.4302	0.1091	0.4847
CYP4F3	-0.955	0.01543	0.05493	0.1739	0.4291	-0.5873	-0.04773	0.9042	0.2481	1.0369	1.6475	1.2257	0.1741
TMEM33	-0.9515	-0.7469	0.08707	-1.0524	-0.7109	0.004322	-0.157	0.05757	0.7661	0.2467	0.1596	0.02128	0.6636
KRT16	-0.9502	-0.6608	-0.2779	-0.02271	-0.1444	-0.3345	-0.1644	0.3439	0.16	0.1484	-0.2141	0.181	0.0861
MAP3K7	-0.9493	-0.2093	-0.9974	0.2219	-0.8577	-0.77	-0.6456	-0.2141	1.1822	0.7164	-0.2156	0.8316	0.3389
PLBD2	-0.9491	-0.2463	-0.2347	-0.887	0.02721	-0.6655	-0.7544	0.2292	-0.1541	0.01257	0.1603	0.1265	-0.156
PRDM9	-0.9427	-0.436	-0.5525	-0.3706	0.4654	-0.2426	-0.3193	0.415	0.5711	0.7457	0.3111	-0.1847	0.5792
OR1E1	-0.9352	-0.2936	-0.4809	-0.3435	0.2311	0.2958	-0.5748	0.07633	0.2547	1.0743	0.8301	0.2201	1.2764
HSFY2	-0.929	-0.2511	-0.2409	-0.07122	0.5799	-0.6468	-0.0814	0.5668	0.1749	0.7384	0.1942	0.5367	0.8349
HSFY1	-0.929	-0.2511	-0.2409	-0.07122	0.5799	-0.6468	-0.0814	0.5668	0.1749	0.7384	0.1942	0.5367	0.8349
POFUT2	-0.9288	-0.5312	-0.1118	-0.6164	-0.327	0.08861	-0.3937	0.4906	0.3945	0.2275	0.3827	-0.2953	0.0206

JAK1	-0.9252	-0.788	-0.4826	0.001783	-0.6283	-1.0785	-0.926	0.4823	1.3645	-0.5433	0.0145	1.1077	-0.1027
SORCS3	-0.9225	-0.6254	0.1014	0.2935	0.02857	-0.9789	-0.4308	0.1905	-0.00055	0.6112	0.5898	0.5995	0.5751
ZNF347	-0.9192	-0.2239	0.3248	0.1057	-0.3818	0.3312	-0.1019	0.6294	0.9733	0.3481	0.7983	0.2367	0.3221
HLA-DPA1	-0.9146	-0.7395	-0.05219	-0.5401	-0.6219	-0.6395	-0.08486	0.0849	-0.3679	0.07228	0.1628	0.9708	0.6372
SSX1	-0.9142	-0.6024	0.1673	-0.1777	0.1718	-1.432	-0.1439	0.203	0.5685	0.531	0.2196	0.2403	0.503
NFATC1	-0.9137	0.4437	0.4252	-0.1254	0.1666	-0.5468	-0.1483	0.9881	0.5118	1.3982	0.2402	0.5473	0.8972
SMAD9	-0.9131	-0.04064	0.195	0.03278	-0.189	-0.1565	-0.02548	0.2939	1.0298	0.3544	0.4575	0.1841	0.08625
CNTNAP1	-0.9069	-0.2479	0.3218	-0.8693	-0.5201	-1.2573	-0.4684	0.532	0.1847	0.7495	1.9218	0.128	0.1326
TDGF1P3	-0.9066	-0.259	-0.4146	-0.837	-0.1698	0.2131	-0.1611	0.02018	0.5213	0.2198	0.488	-0.01983	0.2558
ARHGAP23	-0.9041	-0.4608	-0.2598	-0.7333	-1.0639	-0.2018	-0.6803	-0.5041	0.8722	0.886	0.491	0.0325	-0.2448
ISCU	-0.9034	-1.1206	-0.3599	0.1981	-0.4515	-1.3097	-0.4336	-0.234	0.4493	-0.08653	0.3373	0.4054	0.1519
TSSK3	-0.903	-0.05406	0.1876	-0.1909	-0.1447	0.08278	-0.6313	0.6474	-0.1135	0.2844	0.5834	0.3865	0.5013
HAS2	-0.9001	0.2446	-0.1577	-0.1059	-0.2405	-0.7684	-0.4783	0.4327	0.6003	1.0902	0.1656	-0.2159	0.7567
GUCY1B2	-0.8999	-0.02461	-0.08114	-0.2109	0.2529	-0.09758	-0.7173	1.4007	1.2881	0.3708	0.2492	0.1858	0.3339
CHST2	-0.8964	-0.62	-0.8136	-1.0456	-0.4455	-0.7234	-0.05619	0.7101	-0.3793	0.1438	-0.2657	0.03422	-0.05383
KCNH2	-0.891	0.1186	-0.286	-0.351	-0.04386	0.5854	0.03692	0.7516	0.458	0.2074	1.1246	1.1076	0.3233
NDN	-0.8909	-0.1135	-0.06623	-0.1725	-0.7369	-0.4923	-0.1763	-0.0907	0.6249	-0.2002	0.3442	0.5242	0.2139
FCGR2C	-0.8854	0.3447	0.2526	-0.7514	-0.1467	-0.1062	-0.1303	0.7331	0.488	0.06276	0.5445	0.4272	1.1133
CCKBR	-0.8829	-0.183	0.4555	0.1096	-0.09971	-0.2608	-0.7715	0.6435	0.3876	0.1093	1.1226	0.7027	0.3268
PRMT1	-0.8827	-0.3059	-0.8947	-0.451	-0.3846	-0.3485	-1.1205	-0.1205	0.3352	-0.2397	0.5905	-0.2745	-0.1329
ADAM7	-0.8823	-0.08114	-0.00375	0.03595	0.07085	-0.5074	-0.2763	0.5238	-0.3775	1.169	1.1898	0.2703	0.8099
SMARCAD1	-0.8811	0.1636	0.427	0.09491	-0.3018	0.2798	0.3594	0.9993	0.387	1.3924	0.2219	0.6802	1.0649
LOC646096	-0.8784	-0.4516	-1.2004	-0.2208	-0.7553	-1.0455	-0.08071	-0.3634	0.2002	0.4003	-0.1402	0.3	-0.1725
KCTD3	-0.8773	-0.5419	0.7069	0.336	0.474	0.1299	-0.1027	1.3342	0.4539	0.7225	0.6941	1.0666	0.7263
AK4	-0.8743	-0.4988	-0.01355	0.03943	0.2435	-0.3927	-0.1874	0.6459	0.241	-0.2589	0.8344	0.5989	1.0974
ZAK	-0.8734	-0.2996	-0.3215	-0.5759	-0.4586	-0.8363	0.4522	-0.06398	0.3035	0.9732	0.1166	0.2589	0.578
ZFP112	-0.8732	-0.4034	0.08263	-0.786	-0.507	-0.3706	-0.9178	0.4606	-0.05077	-0.1224	1.2369	-0.01075	0.1284
GEM	-0.8705	0.000266	0.1298	-0.2331	-0.4972	0.009087	-0.2214	0.6311	-0.2485	0.8124	0.1155	1.0966	0.5001
SLC4A2	-0.8691	-0.2307	0.4293	0.0937	-0.2428	0.08082	-0.3268	0.3014	0.4292	0.1227	0.2592	0.4235	0.3758
CDKL3	-0.8677	0.01495	-0.4701	-0.52	-1.0856	0.05194	-0.2966	0.4158	1.0575	-0.03004	0.2643	0.6228	-0.1513
SGPP2	-0.8676	0.3994	0.1113	-0.7542	-0.229	-0.3423	-0.8946	0.1313	0.1744	0.3307	0.5913	0.1539	0.4889
TRPT1	-0.8653	0.2755	-0.01972	0.6692	0.1341	-0.1689	0.3653	0.7846	0.6886	0.536	0.2699	0.8549	0.9899
SPI1	-0.8634	-0.364	0.242	0.1831	-0.434	0.03358	-0.1936	0.2793	0.5092	1.1288	0.6595	0.1219	0.1893
LMBRD1	-0.8591	0.4219	-0.07318	0.2687	0.1867	0.4365	-0.4271	0.9591	0.1248	0.7962	0.539	0.7897	1.0696
GNMT	-0.8591	-0.3175	-0.2979	0.5429	-0.155	-0.1529	-0.6484	0.1773	0.01117	0.8228	0.7036	0.7563	0.2962
NCSTN	-0.8577	-0.6271	-0.3205	-0.5371	-0.09105	0.08072	-0.1235	0.4527	0.1603	0.7587	-0.09001	-0.1003	0.3245
TRPM5	-0.8573	0.5395	0.1463	0.07352	0.405	-0.2663	-0.4435	0.9757	0.2467	0.8632	0.5937	1.2628	0.4071
GRIK4	-0.8553	-0.798	-0.3813	-0.479	0.3214	0.2091	-0.178	0.4757	0.2398	0.237	0.4012	1.1189	0.193
RAB3GAP2	-0.8535	0.6271	0.8084	-0.6499	0.1178	0.08154	-0.00181	0.8877	0.764	0.5798	0.633	0.6046	0.9416

RFX5	-0.8533	-0.4237	0.8173	-0.2596	-0.05957	-0.235	0.3643	0.796	0.5993	0.2916	1.5675	1.0217	0.5937
ACTG2	-0.8532	-0.2631	-0.279	-0.2733	-0.5864	-0.918	-0.5017	0.6631	-0.1971	0.9894	0.2123	-0.4905	0.1076
FBXO6	-0.8528	-0.1235	-0.3585	0.0339	0.000294	-0.2222	-0.1767	0.4374	-0.02667	0.5052	0.4676	-0.2411	1.0058
MCHR2	-0.8511	0.4471	-0.08868	0.9764	0.4771	-0.00187	0.2073	2.0347	-0.00763	1.8407	0.9236	2.4321	1.2766
CD96	-0.85	0.6803	-0.3903	-0.3242	0.02303	0.05978	-0.4524	0.4848	-0.06924	0.9372	0.8079	0.639	1.2414
SFTPC	-0.8491	-0.3074	-0.2772	-0.1119	-0.6217	-0.9788	-0.3327	0.2681	-0.3141	-0.00334	0.5776	0.3183	-0.1779
SPINLW1	-0.8415	-0.646	0.1217	-0.2552	-0.2756	-0.5045	-0.3354	0.7513	-0.5779	0.4631	0.3808	0.3059	0.3721
TRIM48	-0.8385	-0.6645	0.115	-0.3932	-0.5146	-0.8034	-0.6287	0.00165	-0.7607	0.4474	0.7062	0.4628	0.7384
NPAS1	-0.8378	0.4595	0.3854	-0.7251	-0.1157	-0.6619	-0.3072	0.4893	-0.2095	0.7522	1.0586	1.0493	0.8266
ZFP36L1	-0.8309	-0.8543	-0.2925	-0.1191	-0.0232	-1.6129	-0.1969	1.2232	0.191	1.1808	-0.394	0.377	0.4443
NROB2	-0.8301	-0.5187	-0.04752	-0.532	-0.5275	-0.15	-0.07455	0.6326	0.009165	0.001066	0.06323	0.03737	-0.09023
SERPINA1	-0.8272	-0.07759	-0.08938	-0.808	-0.5866	-0.2711	-0.6929	0.5675	0.04003	0.6071	0.2934	0.6472	-0.6447
TNFSF10	-0.8271	-0.4761	-0.3359	-0.3221	-0.2967	-0.6989	-1.7703	-0.3964	0.09304	-0.0721	0.8621	0.2006	1.1676
MAPK1	-0.8271	0.2957	0.4764	-0.3963	0.0319	-0.6777	-0.3924	0.6683	0.08021	0.323	0.6165	0.4257	0.9337
GREB1L	-0.8267	-0.0631	0.5698	-0.4844	0.4833	1.5111	0.6688	1.8568	0.1755	2.3575	1.5959	1.8541	1.9928
EIF2AK3	-0.8252	-0.1693	0.4099	-0.02194	0.181	-0.6604	0.3973	0.7494	0.6791	0.4575	0.3425	0.2517	0.8571
HIST1H2BB	-0.824	-0.2336	-0.07626	0.393	0.2101	0.8133	-0.01456	0.8093	0.6072	0.2724	0.721	0.8731	0.7522
AOC3	-0.8232	-0.2178	0.4183	-0.223	-0.2829	0.1709	-0.1727	0.9788	0.6502	0.4628	-0.00771	0.525	0.1873
SEMA6C	-0.8215	-0.6184	-0.4292	-0.03661	-0.4662	-1.0916	-1.0373	0.0998	0.1788	-0.1338	-0.1047	-0.5272	0.00134
MTMR1	-0.8177	0.03109	0.4881	-0.7201	0.07635	0.196	-0.02363	0.7305	0.3341	1.3176	0.9648	0.4734	0.2256
MEIS3	-0.817	0.6103	-0.2918	-0.4452	-0.9202	-0.935	-0.4347	0.496	-0.3273	1.3123	0.3703	0.3594	0.7955
ATP13A1	-0.8169	-0.3722	0.7077	-0.2975	0.3809	-0.4446	0.07891	1.595	0.3853	0.03582	0.8563	1.264	0.9832
ZNF667	-0.8163	-0.5669	-0.3152	-0.2656	0.1935	0.04869	0.6083	0.3189	1.4979	0.1534	0.4417	0.8411	0.9323
KCNA2	-0.8158	-0.8856	0.192	0.1051	-0.4536	0.05396	-0.2794	0.5423	-0.00251	1.0233	0.07021	0.3052	0.854
FCGR2A	-0.8137	0.2664	-0.06291	-0.7719	0.1162	-0.1344	-0.1457	0.7351	-0.03471	0.2173	0.5368	0.3152	0.7191
RXFP1	-0.8111	-0.1303	0.07008	-0.7411	-0.3668	-0.4168	-0.605	0.6878	0.3117	0.09258	-0.2849	0.5394	-0.1851
RBX1	-0.81	-0.03504	-0.9034	-1.5061	-0.3055	-1.9027	-0.4719	-0.06234	0.3546	0.347	-0.5576	-0.1061	0.08901
OR6K6	-0.8084	0.2096	0.4571	-0.7956	-0.1073	0.1746	-0.01709	0.4232	0.4206	0.8241	0.9534	0.5853	0.1837
PTPN13	-0.8081	-0.2327	0.08911	-0.3034	0.2963	-0.9147	-0.8882	-0.1954	0.353	0.7709	0.5203	1.7633	0.3997
HNRNPA3	-0.8081	-0.4187	-0.6985	-0.5857	-0.629	-0.3979	-0.8757	0.04506	-0.3928	0.3376	0.7688	-0.4578	-0.5273
GMIP	-0.8075	-0.3292	0.3236	-0.446	-0.04613	-1.3891	-0.5517	-0.1235	0.3901	0.411	0.0595	1.085	0.5717
MEP1B	-0.8073	-0.8672	1.0546	0.8249	-0.7719	0.1929	-0.5837	1.9838	0.9574	1.4898	0.5062	1.0949	0.5895
SERPINA4	-0.8066	0.2215	-0.38	-0.6871	-0.7659	-1.9394	-1.1798	-0.3344	0.2946	0.03144	0.7585	0.629	-0.3173
ADAM28	-0.8064	-0.288	-0.4152	-0.606	-0.09108	0.01098	-0.2492	0.1611	-0.2003	0.1563	0.5446	0.53	-0.1813
SCUBE3	-0.8055	-0.9994	0.03669	-1.1219	0.07588	-0.9101	-1.3397	-0.6068	0.03561	-0.1156	0.6062	0.7707	0.5554
ACRBP	-0.8044	-0.0582	0.2859	-0.4842	-0.1059	-0.4611	0.7446	0.4131	0.6826	0.3446	0.679	0.3068	0.5559
MAT2A	-0.8032	0.6849	-1.5058	-0.9635	-0.5157	-0.5267	-0.7563	1.1054	0.1308	-0.485	0.4847	0.8685	0.53
LOC100507699	-0.8027	-0.218	0.1861	-0.03755	0.07031	-0.4069	-0.04468	0.6771	0.3499	0.7556	0.1343	0.1842	-0.02956
PHF13	-0.8022	-0.3746	0.3934	-0.5886	0.06008	-0.5024	-0.9374	0.4182	0.2075	0.4319	0.3843	0.1967	-0.1769

RNASE4	-0.8019	-0.42	-0.175	-0.259	0.4883	-1.9309	-0.605	0.2154	0.2175	0.956	0.4188	0.3397	0.1982
IL17A	-0.7991	-0.2979	-0.1347	-0.3431	-0.08196	0.1521	0.07993	-0.1343	0.7399	0.3983	0.5951	0.07509	0.2171
WWOX	-0.798	-0.5683	0.01756	-0.1394	-0.2857	-0.5461	-0.3527	-0.3394	-0.02074	0.9444	0.7615	0.5834	-0.153
ZNF514	-0.7958	0.392	-0.475	0.0793	-0.5133	-0.4247	-0.477	0.3971	0.8198	0.03949	1.7009	0.8667	-0.1867
GALC	-0.7956	-0.04795	-0.2773	0.1019	0.1521	-0.393	-0.3138	0.6396	-0.2394	0.6285	-0.1171	0.9268	0.998
HIPK1	-0.7923	-0.5385	-0.3516	-0.4366	-0.3476	-0.9417	-0.6933	0.05442	0.5049	-0.5795	0.186	-0.4584	0.01389
PPP1R10	-0.7916	-0.2073	0.1453	-1.3836	0.3754	-0.2515	-0.3267	0.3264	0.3418	0.5719	0.9991	0.4406	2.4581
TRIM43B	-0.7894	0.3497	0.4016	0.1903	0.5681	0.7713	0.6028	1.9996	0.5237	1.3372	0.349	1.574	1.0607
TRIM43	-0.7894	0.3497	0.4016	0.1903	0.5681	0.7713	0.6028	1.9996	0.5237	1.3372	0.349	1.574	1.0607
CYP3A4	-0.789	-0.1025	-0.6091	-0.4519	-0.5767	-0.1106	-1.0082	0.1866	-0.4191	0.3597	0.3949	0.09045	-0.2712
FZD3	-0.7881	0.03929	1.1884	-0.6744	0.1079	-0.2541	0.4294	0.5293	0.6267	1.1961	0.7368	1.4326	0.9715
OR1E1	-0.7876	-0.5541	-0.09466	-0.1528	-0.1337	-0.9431	-0.4856	-0.06117	0.2016	0.413	0.1737	-0.1985	-0.1763
ARFGAP3	-0.7871	-0.3315	-0.1882	0.2396	0.4154	-0.05411	-0.3803	1.4889	-0.5883	0.9017	1.3896	1.028	0.5631
NLRP12	-0.7869	-0.3979	0.1818	-1.2903	0.1914	0.08227	-0.2898	0.9768	-0.2288	0.6656	0.198	1.2105	0.8471
IL22	-0.7865	-0.00887	0.06363	-0.06503	0.04497	-0.05387	0.3225	0.6968	-0.1764	0.4568	1.1758	0.842	0.2311
STRADA	-0.7852	-0.05178	-0.2982	0.4264	-0.7012	0.07194	-0.817	0.2516	0.5238	0.5132	0.6825	-0.1843	0.5661
TRIM43B	-0.7823	0.2375	0.07888	-0.8607	-0.1465	0.5308	-0.3815	0.117	0.4312	0.5051	0.4423	1.0803	0.6946
TRIM43	-0.7823	0.2375	0.07888	-0.8607	-0.1465	0.5308	-0.3815	0.117	0.4312	0.5051	0.4423	1.0803	0.6946
PROCR	-0.782	-0.7951	0.6577	-1.2318	-0.3118	-0.7275	0.1641	0.3075	0.3193	0.2524	0.3836	0.3919	1.3877
ZNF438	-0.782	-0.5827	0.01924	-0.546	-0.3966	0.5258	-0.2145	0.2857	0.35	0.6896	1.0421	0.1205	0.05127
TRAM1	-0.7792	-0.7846	0.4001	-0.09629	-0.7224	-0.5594	-0.0773	0.09569	0.2183	0.688	-0.00707	0.5321	0.08736
ACMSD	-0.7771	-0.7134	-0.6828	-1.1437	-0.5845	-0.4228	0.104	0.3743	0.1965	0.3199	-0.306	-0.536	0.1285
DLK1	-0.7766	-0.7459	-1.1271	-0.5224	-0.08735	-1.266	-1.5451	0.0381	-0.2826	-0.171	-0.2306	-0.2808	-0.7198
CPPED1	-0.7765	-0.1924	0.2097	-0.6477	-1.229	-0.2981	-0.9251	0.5784	0.2243	0.2298	-0.09949	1.4738	-0.2088
LYN	-0.7753	-0.09631	-0.332	-1.0551	-0.6274	-0.5901	-0.04642	-0.08816	-0.04845	0.1708	-0.08333	0.3598	-0.2642
WDSUB1	-0.7751	-0.02813	0.07899	-0.4192	-0.09337	0.1355	0.06323	0.003635	0.3797	0.2459	0.3092	0.5728	0.1026
PRKAR1A	-0.7737	0.4395	-0.7594	0.03463	-0.5301	0.2672	-0.1644	0.317	0.2395	0.4177	0.141	0.4565	0.5064
NUP107	-0.7733	-0.03245	0.000844	-0.1364	-0.9884	0.07464	-0.01884	0.2385	0.5395	0.1034	0.222	0.07063	0.4769
DLG2	-0.7731	-0.6963	0.5742	0.5685	-0.6467	1.4336	-0.06266	1.2469	0.0225	1.4925	2.0188	1.9302	1.6615
ZNF37A	-0.7728	-0.575	-0.2602	-0.2143	0.04508	-0.2227	-0.4367	-0.4194	0.3437	0.04782	0.2214	0.09927	0.3674
TAF1B	-0.7727	0.2018	-0.02364	-0.6243	-0.3038	-0.2141	-0.6363	0.01953	0.3617	-0.1807	0.356	0.2051	0.1371
HDAC3	-0.7713	0.4612	-0.3734	-0.373	0.8408	0.6288	0.0714	1.2863	0.7619	0.6974	0.5865	0.581	1.029
NACAP1	-0.7709	-0.1639	-1.0048	-0.2532	0.1536	-1.1288	-0.8173	0.7449	0.0728	-0.2845	0.09546	0.7175	-0.1483
TNRC6C	-0.7709	-0.00917	0.3813	0.3582	-0.1601	0.3523	0.2385	0.2277	0.3702	0.44	0.717	1.0132	1.1346
PIK3R6	-0.7707	-0.3449	-0.6182	-0.604	-0.5968	-1.4274	0.9253	0.2068	0.2486	0.6989	0.1573	0.4601	0.1265
TRAIP	-0.7699	0.4046	-1.0006	-0.1762	-1.5337	-0.368	0.309	0.5018	0.3346	0.399	0.2561	0.04054	0.8675
CARD9	-0.7635	-0.1266	1.0018	-0.1195	0.5587	0.1103	0.1627	1.1871	-0.1337	1.2788	0.943	1.7525	1.8564
SFXN2	-0.7633	-0.1418	-0.01711	0.4642	0.1151	-0.1228	-0.6329	1.0983	-0.4177	0.07596	1.3686	1.2874	1.8072
TWF2	-0.763	-0.5791	1.523	0.6148	0.07051	1.7073	1.0307	1.7666	0.7453	2.2864	1.7151	2.323	2.4285

ANK3	-0.7612	0.147	-0.0252	0.4041	0.1108	0.118	0.221	0.3823	0.4509	0.4516	1.1876	0.469	0.2219
DNAJB6	-0.7606	-0.4021	0.7037	-0.6762	-0.317	0.06286	-0.3617	0.628	-0.4317	1.2285	1.0923	0.4128	1.3189
HLA-DRB5	-0.7605	-0.05808	-0.03369	0.2098	0.5409	0.729	-0.2872	0.2304	0.5383	0.7833	0.7953	0.846	0.7494
FXYD6-FXYD2	-0.7591	-0.2707	0.3198	-0.557	0.04634	0.01439	0.1389	0.2871	-0.1768	0.7342	0.5306	1.7334	0.967
SSH3	-0.7591	-0.2723	-0.00759	-1.1432	-1.1139	-1.2911	0.1189	0.7066	0.01864	-0.03439	0.4924	-0.3043	0.008941
IDH2	-0.7563	-0.1658	1.0469	0.8507	-0.7953	-1.0087	-0.2282	1.4639	0.3926	0.8758	0.4196	1.0655	1.4348
UCK1	-0.7551	-0.7091	-0.1339	-0.7448	-0.7271	-0.9141	-0.08114	0.2903	-0.4699	0.2325	-0.5945	0.5242	0.7103
TET1	-0.7551	0.3818	-0.3465	0.1898	0.4028	-0.8526	0.2336	0.67	0.9015	-0.02177	1.0481	0.8602	0.5408
OSGEPL1	-0.7546	-0.4703	0.0511	0.3942	-0.06806	0.616	-0.7721	0.4751	0.3518	0.3376	0.8959	0.3691	0.7212
SLC7A11	-0.7545	-0.602	0.04772	0.1118	0.5016	0.08221	-0.1817	0.8106	1.0825	0.993	-0.07021	0.3207	0.4763
FGF9	-0.7537	-0.1333	-0.1514	0.09698	0.06528	-0.3318	0.01698	0.1139	0.5634	0.02569	0.06747	0.7717	0.1525
CLCA4	-0.7533	0.6746	0.6096	-0.07055	-0.1459	0.5096	-0.00786	1.0223	1.275	0.4631	0.5011	0.8235	0.6206
ZNF780B	-0.7526	0.2645	0.06325	0.3777	-0.4756	-0.5864	-0.1609	0.576	-0.2367	0.616	0.7768	1.4677	0.5172
CES1P1	-0.751	-0.5413	0.2757	0.1896	-0.03907	-0.5168	-0.4315	0.374	0.2983	0.5229	0.1328	-0.1319	0.5963
GRIA1	-0.7506	0.2549	1.0687	-0.4357	0.444	-0.9524	-0.5429	0.8893	0.502	0.4585	0.7842	0.5643	0.9522
HIST1H2BH	-0.7502	-0.07471	0.8579	0.03224	0.2936	0.3418	0.6058	1.4592	-0.4284	1.51	1.0211	2.3625	2.3377
SLCO4A1	-0.7493	0.5921	0.6258	0.6422	-0.5314	0.5028	0.03642	2.0082	-0.4394	0.9658	1.6537	2.0521	2.7222
SKIV2L2	-0.7492	-0.8435	-0.01833	-1.1056	-0.02204	-2.0078	-1.1642	-0.1752	0.5942	-0.8965	0.3935	1.1819	0.3382
GNAT2	-0.7487	-0.3539	-0.1171	-0.3435	-0.3624	0.07771	0.04297	0.4359	0.2457	-0.2278	-0.06228	1.2687	0.6039
ZCCHC14	-0.7487	0.0165	-0.3253	0.3276	-0.5227	-0.4638	-0.5707	0.687	0.2807	-0.149	0.1826	0.1372	0.1459
SP110	-0.7481	-0.08749	-0.7156	0.3002	0.6329	0.07079	0.187	0.857	0.3543	0.925	0.7087	0.833	0.1502
MYO3B	-0.7481	-0.1129	0.1105	0.7424	-0.5722	0.06312	-0.2451	0.01668	0.4502	1.04	0.8153	0.7223	2.1497
BBS7	-0.747	-0.4513	0.4305	0.02221	-0.5839	-0.1392	0.1151	0.7546	0.0227	0.39	1.336	0.2599	2.6319
PMF1	-0.7466	-0.5184	-0.5137	-0.3352	-0.8296	-1.029	-0.848	-0.3748	0.149	-0.07664	0.4245	-0.6766	-0.4837
BIRC8	-0.7463	0.004563	0.675	0.6513	0.5669	0.3379	1	1.4083	0.7551	0.5949	1.2826	0.9286	1.2198
CDHR5	-0.7458	0.4218	0.1199	-0.05415	-0.666	-0.01045	0.5293	0.5403	1.2068	0.679	1.3112	0.4683	0.1006
ZNF222	-0.7441	-0.6674	1.2231	-0.8812	-1.0655	-1.1013	-0.3688	0.5837	0.4418	1.7143	-0.01053	0.749	0.2418
ZNF611	-0.7433	0.2734	0.06374	-0.2973	-0.1746	-0.29	-0.3704	-0.3915	0.9475	1.0008	0.06968	0.3358	0.8824
DCX	-0.7432	-0.4711	0.6097	-0.1074	-0.6309	-0.4577	-0.7314	0.6078	-0.08352	0.554	0.1554	-0.00143	0.5885
RMND5A	-0.7429	0.6679	-0.3791	-0.8841	0.5774	-0.2125	-1.7411	0.1436	0.94	0.4252	1.2118	0.6861	0.4147
LEP	-0.7422	-0.2017	0.3811	-0.2338	-0.4021	-0.2573	-0.05463	0.2711	-0.2809	0.4483	0.3103	0.552	0.9782
BIK	-0.7401	-0.2951	-0.8794	-0.1656	-0.5828	0.3389	-0.3078	1.0231	0.192	0.01761	0.1366	0.2978	-0.02604
N6AMT1	-0.7351	-0.1894	-0.2859	-0.6159	-0.1826	0.2094	0.6521	0.2661	0.6804	0.6021	0.4053	0.07955	0.4711
NKX2-1	-0.7344	-0.6128	0.6248	0.7551	-0.1299	-0.1905	-0.3899	1.043	0.6864	0.826	0.912	-0.1135	1.5685
METTL4	-0.7331	-0.2964	-0.8327	-0.3446	-0.1683	-0.3463	-0.4592	0.7112	0.4006	0.336	0.2263	-0.3549	-0.5914
CIB3	-0.7329	-1.1948	-0.1199	0.1787	0.07303	-1.5346	-0.6944	-0.1078	0.4753	0.01337	0.02058	0.7384	0.1202
ROBO1	-0.7327	0.3446	0.04219	-0.8188	0.06888	-0.2108	-0.1533	0.2775	0.4568	0.1483	0.7934	0.6514	0.003881
WFDC12	-0.732	-0.2567	0.05207	-0.1514	-0.05732	-0.7397	-0.4702	-0.174	0.238	0.4133	-0.3088	0.6888	0.5664
CHN2	-0.731	0.01007	-0.6391	0.09309	0.2739	0.09182	-0.3929	0.4053	0.1339	0.1413	0.3401	0.8121	0.2357

LAMA2	-0.7307	-0.2928	-0.9599	-0.518	0.01974	-0.05017	-1.0554	0.1116	0.4007	0.4417	0.7121	0.8709	-0.797
ZNF585B	-0.7301	0.1035	1.0518	-0.9311	0.3813	0.1016	0.07387	2.2053	0.0432	0.3459	1.7403	2.1763	1.1312
PFDN1	-0.7295	0.5906	0.5289	-1.1064	0.003316	-1.0055	-0.1659	1.0237	-0.333	2.0367	1.3126	1.0588	0.4548
ACVR2B	-0.7283	-0.1568	0.1802	0.147	0.07144	-1.6285	-0.8757	0.7713	-0.01444	0.4984	0.3892	0.2751	0.1834
MAP3K1	-0.7277	0.519	-0.3994	0.05261	-0.03456	0.2393	0.3448	0.6635	1.0698	0.2914	0.6509	0.4672	0.2808
LONRF3	-0.7275	-0.7967	0.3397	-0.08385	-0.1645	-0.3709	-0.4131	0.1913	0.6117	0.08059	0.6041	0.06671	-0.09167
MS4A1	-0.7273	0.5977	1.1651	-0.172	-0.03192	0.2728	-0.3067	0.7905	0.8398	1.0917	0.4576	1.9052	0.9809
ITGA3	-0.7267	0.5422	-0.2783	0.06693	0.02953	0.177	-0.1337	0.5513	0.3849	0.3439	0.6581	0.574	0.06236
HLA-DQB2	-0.7262	0.1854	0.02301	-0.1463	0.178	1.121	0.928	1.5475	0.7299	1.3762	2.2972	0.5976	0.807
GPR148	-0.7255	0.03194	0.652	0.4565	0.0228	0.673	0.2903	0.7315	0.4394	1.6751	0.601	0.6899	1.4053
MKX	-0.7252	-0.6518	-0.3048	0.4386	-0.2612	-0.1677	-1.0183	0.1877	-0.3574	0.3149	0.4595	0.4283	0.6396
PCDHA13	-0.7249	-0.3109	0.4599	-0.5826	0.1699	-0.4818	-0.271	0.6693	0.03808	0.4109	1.0928	1.1532	-0.2174
ACADS	-0.7215	0.3692	-0.5653	-0.827	-0.2668	-0.2021	-0.3114	-0.01702	0.2599	0.1303	-0.08095	0.3684	0.02365
ZNF182	-0.7199	-0.2524	-0.4425	0.1535	-0.3753	-0.2775	0.03095	-0.1607	0.4391	0.1811	-0.01789	0.08466	0.2214
AMY2A	-0.7196	-0.5503	0.389	0.922	-0.03759	0.04251	-0.1868	1.0621	1.0085	0.5963	0.3495	0.2647	1.1898
TBC1D9B	-0.7193	-1.0766	-1.3033	-0.0033	0.02789	-0.09164	-1.3908	0.3657	-0.353	0.8685	0.1841	-0.339	0.4451
TSLP	-0.7188	-0.2055	0.4866	-0.6049	0.2528	-0.8182	-0.8864	-0.471	0.444	0.7864	0.8539	0.3894	0.9341
PIK3CB	-0.7181	0.1275	-0.4628	0.2543	-1.9786	0.2909	-2.6051	0.7034	0.9789	0.01565	0.2951	0.1489	0.4458
PRKAG1	-0.718	-0.2477	0.6237	-0.2596	0.05823	0.2908	-0.6226	1.7122	1.4745	-0.1427	0.8997	-0.08728	1.4031
COL4A2	-0.7151	-0.9007	-0.71	-0.6197	-0.1889	-0.5469	-0.6843	-0.2957	-0.1083	-0.442	-0.06945	-0.5925	0.4675
SLC5A12	-0.715	-0.4555	0.3657	-0.611	-0.5799	-0.4136	-0.4072	0.5565	0.7918	0.2153	0.3822	-0.1378	-0.4285
HELLS	-0.7137	-0.2502	0.2055	-0.232	-0.4488	-0.8488	-0.02855	0.5881	-0.4371	0.7515	1.2182	0.1762	0.1154
ADPGK	-0.7133	0.5032	0.4662	-0.8753	0.5766	-0.3023	0.4031	0.5815	0.6488	1.2136	0.5831	0.4988	0.9371
SIM2	-0.713	-0.406	-0.4588	-0.2096	-0.3774	0.3397	-0.2439	0.1265	0.7557	-0.155	0.03179	0.4216	0.1049
BBOX1	-0.7124	-0.01328	-0.2554	0.2018	0.1376	-0.4879	0.4602	0.1581	0.2485	1.0987	0.07037	1.5587	0.9628
EFCAB1	-0.7121	0.7843	0.5265	0.7929	-0.2189	-0.1312	-0.1444	2.5997	0.6056	0.8297	0.5395	1.7567	0.8358
OBP2A	-0.7115	-0.451	-0.5613	0.004512	-0.4584	-0.195	-0.6056	-0.4661	-0.02737	0.3335	-0.3217	0.699	1.0476
GPR15	-0.7112	-0.6935	0.1658	-0.6104	0.6559	-0.2335	-0.5418	0.1399	0.5966	0.8943	0.6384	0.5776	-0.1811
BBS4	-0.711	0.2607	-0.1244	-0.3049	-0.08696	-0.5547	0.2662	0.2842	0.5506	0.08707	0.3021	0.5515	0.01096
MATR3	-0.7108	-0.6252	-0.1891	0.00191	-0.1019	-0.5936	-0.0319	-0.2699	0.7934	1.0693	-0.5084	0.5785	0.6875
ATP6V1B2	-0.71	-0.7158	0.2091	-0.6122	0.1144	0.6084	-1.377	0.1081	1.1769	0.1804	0.3162	0.5065	1.4869
RAVER1	-0.7087	-0.3648	-0.4734	-0.6964	-1.0316	-0.5495	0.2295	0.1085	0.8848	0.867	0.8463	-0.04363	-0.8304
FETUB	-0.7082	-0.07564	-0.3166	-0.07829	-0.433	-0.00891	0.5196	0.8606	0.2232	0.6019	0.316	0.1328	0.1263
HAAO	-0.7071	-0.7533	-0.04987	0.2612	0.112	1.5941	-0.8594	0.6884	1.0894	0.803	0.428	1.2812	1.1178
PKNOX2	-0.7057	-0.0222	0.01942	-0.09454	-0.8592	-0.2486	-0.1026	-0.04622	-0.1567	0.4883	0.3518	0.6445	0.1225
FGR	-0.7053	-0.536	0.1497	1.1881	0.1708	2.5293	0.8181	2.4153	1.029	1.7319	1.8668	2.8511	1.639
BCL9	-0.7049	-0.4312	-1.2011	-1.0181	0.07526	-0.7101	-0.00985	0.6573	0.6968	-0.1113	0.07642	-0.113	-0.3996
SIRPG	-0.7044	-0.2269	0.9907	-0.2857	-0.5336	-0.3412	-0.9057	0.3376	0.3149	0.2872	0.6672	0.5202	0.1061
ZNF524	-0.7026	-0.00018	-0.4188	-0.734	0.03538	-0.2626	-0.1174	-0.2243	-0.7524	1.401	0.4651	1.2801	1.744

MAT1A	-0.7025	-1.836	-0.8944	-1.2442	0.1242	-1.0973	-1.2559	-0.415	0.2384	-0.212	-0.8783	-0.3494	-0.3404
ROBO3	-0.7016	-0.7009	1.3943	0.6346	-0.9833	-0.6944	-0.8175	0.4576	1.0973	0.3078	1.3906	0.7018	0.6735
SELPLG	-0.6998	-0.8105	-0.471	-0.5645	0.04155	0.148	-0.266	0.087	-0.1359	0.3363	0.7536	-0.04546	0.007277
POLR2H	-0.699	0.7371	-0.8991	-0.3292	-0.4089	-0.7409	-0.515	0.2869	0.3957	0.04081	0.3503	-0.1963	0.7728
PRSS42	-0.6971	-0.8563	0.3077	-0.4511	0.1755	0.1589	-0.2773	0.2526	0.474	0.145	0.6219	0.9836	-0.01831
C12orf52	-0.6966	-0.4131	0.1181	-0.5759	-0.2754	-1.2441	-0.6845	-0.00174	0.5468	-0.1142	-0.2427	-0.153	-0.03517
DLX6	-0.696	-0.2328	-0.2023	-0.3828	0.1799	-0.01663	-0.1257	-0.04952	-0.1607	0.2361	0.2739	0.2219	0.4602
GUCY1A2	-0.6945	0.6386	-0.06971	-0.2133	0.178	0.9024	0.251	1.5871	-0.05303	1.4037	1.1475	1.8492	0.5031
RIPK1	-0.6939	-0.08299	0.2814	0.6494	-0.01972	0.04099	0.3162	0.427	0.9518	0.6168	0.08115	1.2358	0.6883
E2F1	-0.6932	0.4733	0.212	0.7893	0.7928	0.5317	-0.00717	1.758	0.2736	1.9519	0.9692	0.411	2.6404
KRT24	-0.6932	-0.1792	0.8259	1.1076	0.98	0.02878	0.6983	1.8462	-0.02125	2.1137	1.7598	1.1763	2.3897
DDX5	-0.6912	0.1156	0.9823	-1.8101	-0.1672	-1.0354	1.0221	1.3492	0.4556	0.7137	0.6346	0.8397	1.5827
JUB	-0.6909	0.1887	0.3871	-0.09661	0.2558	0.5347	0.2489	1.1499	0.4242	0.6021	0.4164	1.8523	0.3872
SLC35C2	-0.6902	-0.07509	1.0062	-0.3132	-1.0259	-0.939	-0.4101	0.8525	-0.3021	0.7311	0.4271	1.1605	0.4834
SOD1	-0.6899	0.0219	-0.9547	-0.3323	-0.303	-0.9572	-1.5389	0.9118	0.7396	-0.2017	0.4976	-0.4256	-0.5746
IL21R	-0.6897	-0.1491	-0.09475	-0.08267	-0.4505	-0.833	-0.3098	0.5529	0.9972	-0.5624	-0.2692	0.6022	0.376
ACOT11	-0.689	0.9211	1.113	-0.5884	-0.4783	-0.135	0.08893	1.1674	0.4811	0.5206	0.892	1.7796	1.0072
HS2ST1	-0.688	-0.1886	-0.01415	0.145	0.002125	0.005992	-0.3561	0.0992	0.02651	1.0691	0.4168	0.4123	-0.01995
PCDHA13	-0.687	-0.5758	0.0954	-0.5403	-0.1887	-0.7146	-0.222	-0.3773	0.1578	-0.01417	0.154	0.1588	-0.09804
S100A8	-0.6869	0.03068	-0.7551	0.0069	-0.9855	-0.6343	0.2867	-0.2076	1.2144	1.8366	-0.1815	0.3525	0.3901
10-Mar	-0.6867	-0.2706	0.07514	-0.1647	-0.07086	-0.3941	-0.7434	1.0275	-0.09311	-0.2725	0.6313	-0.05487	0.4443
SLC28A2	-0.6856	0.7767	0.2378	-0.8189	-0.2827	0.2594	0.1953	0.5072	0.365	0.3394	0.6802	0.741	0.737
RBM26	-0.6853	-0.7385	-0.9858	-0.8479	-0.8936	0.07734	-0.7227	-0.9133	0.3707	-0.02803	-0.09856	-0.2707	0.4207
ILKAP	-0.6851	-0.8473	0.7107	-0.6423	-0.459	0.8124	0.3266	0.5536	0.2227	2.08	0.2286	2.3296	1.2835
SFTPA1	-0.684	0.0299	-0.2988	-0.4927	-0.7539	-0.8717	-0.2505	0.3361	-0.2694	0.6009	-0.4732	-0.0498	0.2464
SACM1L	-0.6837	-0.09723	0.3416	-0.1749	-0.4042	-1.9907	-0.1973	-0.3317	0.9037	0.3177	0.2484	0.6887	1.2912
SUGT1	-0.6815	0.6926	0.1654	-0.9337	-0.3332	-0.3364	-1.4416	0.8739	0.5645	-0.1706	0.008847	0.6309	0.7285
ALKBH3	-0.6812	-0.9886	-0.1663	-0.0189	-0.2873	-0.1513	-0.5218	-0.4597	-0.02162	0.2299	0.2277	1.2212	0.3782
SULT4A1	-0.68	0.07259	1.2055	1.4539	1.521	0.888	0.06653	2.1899	0.2118	2.8425	1.6196	2.4911	2.3935
NAALAD2	-0.6794	-0.58	0.1446	-0.1357	-0.2899	-0.2259	0.2679	-0.1222	0.1134	0.02737	0.5242	1.5227	0.9505
INVS	-0.6792	0.2085	0.663	-0.2381	-0.2185	-0.6055	0.4182	0.5113	0.7933	1.2722	0.7151	0.3048	0.1685
MXD4	-0.6787	-0.4583	0.002729	-0.1544	0.07013	-0.8571	-0.8086	0.5051	-0.5876	0.5961	0.4747	0.3804	-0.06535
GLP2R	-0.6785	-0.5151	-0.2145	0.3144	-0.5506	-1.4762	0.8368	0.6827	-0.04285	0.9691	0.5864	0.1931	0.8097
F3	-0.6777	0.7027	-0.197	0.2469	0.7908	-0.1012	0.6466	0.7318	0.4092	1.4644	0.6957	1.1372	0.9003
KIN	-0.6764	-0.04892	0.5566	0.5508	0.3756	0.7856	0.4502	1.2922	-0.2153	1.8523	0.7494	1.799	1.5147
GALNT12	-0.6764	0.3734	0.4243	-0.3204	0.1389	0.1033	-0.261	0.6777	-0.1786	0.3949	0.8551	0.7813	0.7912
OSCAR	-0.675	-0.4188	-0.5254	-1.1124	-0.277	-0.2115	-0.8344	0.7293	-0.1742	-0.1884	-0.916	0.6945	0.5137
CAPN1	-0.6745	-0.6746	0.3578	-0.5191	-0.1745	-0.2871	0.4525	1.5099	-0.3279	0.8728	1.146	0.296	0.2447
OR5M10	-0.6735	-0.2428	0.7806	1.0834	0.2143	0.2675	0.02673	2.3352	0.09811	1.6666	2.1783	1.3967	0.2681

ADRA1A	-0.672	-0.5874	-1.2487	0.3853	0.1324	-0.2208	-0.8068	0.6344	-0.08019	0.9812	0.4609	-0.2607	0.2298
BMP6	-0.6709	-0.5688	-0.5225	0.1094	0.4935	-1.0689	-0.4862	0.06364	-0.2424	0.8499	0.6101	0.01757	0.6264
CTBP2	-0.6704	-0.4497	-0.4398	-0.7429	0.8026	0.5164	-1.6151	0.2444	0.8082	0.9977	-0.1896	0.7177	0.8327
TNFAIP8	-0.67	-0.2362	-0.5961	-0.551	-0.237	-1.0431	-0.1502	0.5099	1.1755	-0.3814	0.4166	-0.3864	-0.2644
SIX4	-0.668	-0.3074	0.08757	-0.716	0.1737	-0.1958	-0.1871	0.1386	-0.09703	0.2427	0.03973	0.6139	0.1515
SPRED1	-0.6677	0.2188	0.3209	-0.2017	-0.3694	-1.033	0.289	0.3237	-0.02395	0.5068	1.0527	0.7007	0.2676
RDH8	-0.6675	-0.2614	-0.3535	-0.8261	-0.4838	-0.5623	-0.5884	-0.3335	-0.2328	0.6996	0.1373	-0.5542	-0.22
LOC100507804	-0.6674	-0.458	0.02646	-0.6773	0.2793	0.1416	0.05478	0.9603	-0.3949	0.9726	0.4958	1.1034	0.1005
APEH	-0.6671	-0.1802	0.2992	-0.2947	0.467	-0.4655	0.04504	0.5211	0.2101	0.2293	0.04161	1.128	1.4681
PSIP1	-0.6652	-0.09575	0.5089	-0.1368	-1.0603	-0.4483	-0.5868	0.7438	-1.098	1.3844	1.2716	0.3602	1.6276
LEPREL2	-0.6646	-0.6358	-0.507	-1.1498	0.1431	-0.3506	-0.1209	0.5557	-0.6296	1.2605	0.1036	-0.03578	0.4401
ZNF585A	-0.6639	-0.3231	0.6128	-0.4442	-0.7666	-0.7852	0.7808	1.2732	0.4156	0.1723	0.511	0.1874	1.1899
RBL1	-0.6632	0.2354	0.2037	0.5803	-0.437	-1.1108	-0.02318	0.8122	0.1258	0.2534	0.5222	0.6775	0.4698
ZNF645	-0.662	-1.2857	-0.9081	-0.6576	-0.3517	-0.3414	0.1439	-0.7758	0.5969	0.3638	1.4025	-0.3036	0.2797
NOX3	-0.6613	0.3169	-0.1028	0.3826	0.4833	0.02889	-0.1211	0.1698	0.1326	0.6743	0.7073	0.7567	1.2981
OR6V1	-0.661	0.01847	0.4907	-0.1969	-0.4031	-1.1534	-0.4245	0.5153	0.5081	0.01502	-0.2395	0.4297	0.6135
ADORA2B	-0.6609	-0.5855	-0.2672	-0.1995	-0.05163	0.2919	0.09496	0.4854	0.4782	0.3404	-0.3416	0.3952	0.3819
FSHR	-0.6608	-0.02934	-0.07332	-0.4602	0.5671	-0.335	-0.6394	0.3244	-0.463	0.5982	0.2832	1.5957	1.4842
HDAC2	-0.6606	0.04531	-0.4981	-0.08724	0.06068	-0.9556	0.3305	0.9096	0.869	0.4626	1.3518	-0.2681	-0.09867
CAPN5	-0.6602	-0.8719	0.4141	0.3257	-0.5658	-0.7161	0.6366	0.7063	0.05171	0.3419	0.2886	1.647	1.2551
RNF121	-0.6587	-0.3757	0.005882	0.1573	0.1449	-0.3092	-0.2148	0.2135	0.03887	0.8163	0.3964	-0.1966	0.4503
ZNF484	-0.6586	-0.3808	-0.3707	-0.9714	-0.3833	-0.946	-0.2995	0.5318	0.1124	-0.5801	-0.4981	-0.1312	0.09097
NFE2L2	-0.6574	-0.1832	-0.5271	0.004488	-0.6856	0.1762	-0.5907	0.002837	-0.00749	-0.3307	0.835	0.2916	0.3715
METAP1	-0.6551	-0.6484	-0.9095	0.1623	-0.3805	-0.3177	-0.276	-0.264	0.3436	-0.07041	0.8244	0.6978	-0.4337
PKM2	-0.6547	0.2762	-0.4527	-1.4945	0.4516	-1.3501	-0.2299	0.3726	-0.05674	-0.1023	0.6046	0.1859	0.8143
LOC652797	-0.6547	0.2762	-0.4527	-1.4945	0.4516	-1.3501	-0.2299	0.3726	-0.05674	-0.1023	0.6046	0.1859	0.8143
NBEA	-0.6539	0.1918	0.2492	0.1149	-0.4384	-0.1151	-0.257	0.2371	0.5392	-0.2289	0.1522	1.4258	1.2252
S1PR2	-0.6539	-0.6796	-0.182	-0.0579	-0.1087	0.1333	-0.4086	-0.3165	-0.1892	0.4389	0.2791	1.1787	0.5635
ZNF85	-0.6533	-0.5811	-0.6525	-0.1577	-0.00018	-0.2832	-1.1065	0.3086	0.3878	0.001542	-0.422	-0.07935	-0.2029
NHP2L1	-0.6533	-1.6956	-1.7378	-0.971	0.3174	-3.139	0.6687	0.0857	1.1299	-0.05108	-0.4502	-0.1334	0.7847
PCSK1	-0.6531	-0.5028	-0.1573	-0.4033	-0.2718	-0.1104	0.2373	0.03041	-0.07899	0.4092	0.6217	0.3825	-0.2439
CUL2	-0.653	-0.3855	-0.4375	-0.8456	-0.0458	-0.4807	-0.1392	0.1659	-0.09267	0.1219	-0.3657	-0.1562	-0.1331
PC	-0.6528	-0.6592	-0.5747	-0.5928	0.1006	-0.5732	0.1636	0.2587	0.4493	0.1391	-0.3179	0.211	-0.2254
HRSP12	-0.6527	0.4195	-0.2331	-0.00354	-0.2047	0.09177	0.1067	0.3864	0.375	0.8624	0.08788	0.4914	0.062
ZNF76	-0.6524	-0.2731	0.08326	-0.2823	-0.5112	0.3997	0.05484	-0.2344	0.3223	0.6523	0.5812	0.3918	0.2717
SLA	-0.6521	0.05603	-0.06181	-0.00122	-0.2648	-0.5256	0.02709	0.5167	0.2716	0.6325	0.1709	-0.04545	-0.1917
EFEMP1	-0.6517	0.5193	-0.5264	-0.9219	-1.136	-0.04487	0.1284	0.276	0.226	1.111	1.4269	0.2957	-0.3079
ETV1	-0.65	-0.1518	0.01968	-0.8066	0.9427	-0.6354	-0.4782	0.2864	1.1108	0.9752	0.1358	0.2118	0.2894
TNFAIP3	-0.6498	0.6566	0.07842	-0.00104	0.7118	-0.6243	0.1647	1.0513	-0.3596	1.6694	1.0773	1.3311	0.8361

LGALS3	-0.6496	0.1325	-0.2224	0.6108	-0.9906	-0.3254	0.6321	0.4866	1.0828	0.6794	0.5573	0.151	0.4851
PAPD5	-0.6495	0.2417	-0.2498	-0.2755	0.2582	-0.8945	-0.1754	0.1047	0.306	0.01717	0.04236	0.5161	0.8834
SCG3	-0.6489	-0.336	-0.4032	-0.7392	0.03811	-0.7453	-0.399	-0.124	-0.1534	0.1004	0.2708	-0.4838	-0.06585
TGFA	-0.6486	-0.05715	0.2944	0.06956	0.01232	-0.1011	-0.6646	0.08926	1.3524	0.1606	0.2817	0.2418	0.5012
PZP	-0.6485	0.1765	0.3442	0.8005	0.583	-1.0369	-0.395	1.521	0.2332	0.6654	0.6877	1.3254	0.587
CD99	-0.6481	-0.2693	0.0967	-0.04771	0.04628	0.1358	0.2583	0.5831	-0.291	1.1453	0.4051	1.2554	0.1302
RCAN1	-0.6476	0.01496	0.1576	-0.5616	-0.3049	-0.9234	-0.09335	0.2966	-0.2968	0.5074	0.3572	-0.1694	0.511
CLEC3A	-0.6467	0.1817	-0.375	-0.721	-0.8287	-0.185	0.1986	0.3926	0.3353	-0.142	-0.04583	0.0674	0.1772
TGFBR1	-0.6465	0.05365	-0.2946	-0.6439	-0.2779	0.6471	-0.6586	0.5763	0.8176	-0.4096	0.4824	0.3205	0.6012
LOC440563	-0.6457	0.109	0.2721	-0.5952	0.3417	-0.8553	-0.4999	-0.2812	0.294	0.4503	0.5196	0.5005	0.4366
RSC1A1	-0.6453	-1.1422	1.2304	0.2612	-0.1452	-0.3545	0.2544	0.9697	-0.09276	0.9019	1.0631	1.04	1.0038
LDHC	-0.6445	0.4847	0.4725	0.2664	-0.4919	0.2579	0.1831	0.8209	0.3195	0.5131	0.9211	1.3767	0.2507
MBOAT7	-0.6444	0.6614	1.0666	-0.4178	0.9038	-0.8437	0.3792	1.3483	0.1494	0.8801	1.9255	1.3708	1.3458
BCL9	-0.6434	-0.2178	-0.8292	-0.9405	0.6069	-0.2634	0.1689	1.2076	0.4976	0.06152	-0.02194	0.7069	0.1524
FLG2	-0.6431	-0.7368	-0.5792	-0.4939	-1.0981	-0.2439	-0.449	-0.2061	0.4108	-0.2609	-0.3623	-0.6261	-0.09646
PRMT8	-0.642	-0.3204	-0.8756	-0.8049	-0.8129	-0.289	-0.2867	-0.02628	0.000629	-0.1001	-0.2345	-0.3489	-0.6307
LHX8	-0.642	0.1201	-0.2133	0.2499	-0.517	0.5255	-0.4445	0.6817	-0.1208	0.9378	0.2038	0.3753	0.7362
PON1	-0.6419	-0.3977	-0.3368	0.158	0.1182	-0.0329	-0.1654	-0.05732	0.2112	1.1827	0.3902	-0.1643	0.5435
THEM5	-0.6416	0.02186	-1.1953	0.3284	0.00276	-0.9612	0.5426	0.2328	0.09909	0.7346	0.09033	1.3932	0.9557
MAP1B	-0.6414	-0.2449	1.0562	0.6839	0.1013	-0.3734	0.6524	0.7921	0.7962	0.9988	0.7955	0.6474	0.5915
RNF8	-0.6411	-0.1638	0.06275	-0.3452	0.09511	0.008259	-0.66	0.09554	0.3044	-0.0949	0.2562	-0.03432	0.6842
DDI2	-0.6394	-0.8272	1.0488	0.3724	-0.1101	-0.1923	0.2189	0.6214	-0.1352	1.0573	0.9621	1.0972	1.3099
RARA	-0.6391	-0.8121	-0.4737	0.2386	-0.2213	-0.7952	0.602	0.5112	-0.04713	0.2886	0.2652	0.1638	0.2411
PRKCB	-0.6385	-0.6631	-1.599	0.4028	-0.5132	0.8272	-0.7429	0.05912	0.4205	0.5206	0.376	0.01639	0.5065
SLC38A2	-0.6383	-0.264	-0.00314	-0.3599	0.1445	-0.6282	0.376	0.1135	0.01889	0.2619	0.2508	0.3111	0.9209
NODAL	-0.637	0.7541	-0.4414	0.09987	-0.506	0.0961	0.5635	0.4411	0.1002	0.9043	1.1065	0.9368	0.486
Luciferase	-0.6367	0.7224	-0.3377	-0.1435	0.065	-0.07305	-0.09641	0.2627	0.007771	0.7097	0.566	0.9952	0.3371
RASL11B	-0.6353	-0.9042	-0.03822	-1.4125	-0.2721	-0.1699	0.1286	0.6826	0.3056	-0.5518	0.3537	0.3317	0.05442
ABCC3	-0.6344	-0.1644	-0.3468	-1.0777	-0.3598	0.1997	-0.885	0.1662	0.7987	-0.04054	0.3819	-0.01762	-0.4834
CAMK1D	-0.6342	-0.7918	0.1047	-0.5335	-0.2533	-0.2832	-0.3467	-0.4693	-0.102	0.03593	0.03895	0.3113	0.4826
CDX1	-0.634	0.06409	-0.2526	0.07772	-0.5777	-0.1911	-0.3151	0.09899	-0.03292	1.1914	0.09719	0.4519	-0.1742
LACTB	-0.6338	-0.2015	-0.323	-0.9439	0.3467	0.311	-0.2633	0.4076	0.233	0.1129	1.0213	0.1429	0.1434
GATA1	-0.6336	-0.1834	0.2218	-0.5323	-0.2064	0.3135	0.09131	0.1722	0.05181	0.6426	-0.04901	1.1485	0.7032
PRDM7	-0.633	-0.5364	0.252	-0.3327	0.3955	-0.3359	-0.494	0.5386	0.2927	0.9101	0.06922	-0.3537	0.8128
CEACAM6	-0.6328	-0.9759	-0.00655	-0.2333	-0.09985	0.07867	-0.7587	-0.04181	0.4958	-0.3202	0.03115	0.5127	0.1994
GPR39	-0.6324	-0.2955	0.4455	-0.9856	0.2485	-0.4189	-0.2042	0.1205	0.144	0.6419	1.0125	-0.2407	1.0054
FAM18A	-0.6313	-0.4013	-0.4303	-0.4978	-0.2479	-1.1803	-0.2814	0.3304	0.4082	-0.4284	-0.0138	-0.6062	0.1181
USP21	-0.6309	0.06882	-0.2579	-0.344	-0.321	0.09436	-0.4016	-0.1515	0.5735	-0.1771	0.1494	0.02505	0.3628
GLUL	-0.6307	-0.2661	0.8493	-0.4904	-0.5313	-1.0603	-0.2425	0.6777	-0.2946	1.0132	0.7708	-0.2507	1.0283

RDX	-0.6307	-0.1052	-0.2164	-0.7096	0.3074	-1.0535	-0.721	0.03844	0.2485	1.2232	1.1906	-0.5088	-0.1115
ZFP91-CNTF	-0.6305	0.288	-0.6557	0.03958	-0.5978	-0.5559	-0.9747	0.5824	-0.00939	-0.1405	0.5433	0.1171	-0.3455
FOS	-0.6293	0.7389	-0.07687	0.251	-0.6467	-1.3078	-1.5741	1.1358	0.4111	0.841	0.71	0.05124	-0.323
YKT6	-0.6293	-0.2837	-0.2932	-0.3493	-0.2751	0.8005	-0.9714	0.02093	0.9015	0.8241	0.6509	0.09587	-0.06428
CNTF	-0.6288	-0.01064	-0.2265	0.1762	-0.3674	-0.5172	-0.5204	1.1918	-0.0985	-0.09164	0.6866	0.2186	-0.2202
COBL	-0.6279	-0.5252	0.7212	-0.7444	-0.01749	-0.2556	0.2524	0.4076	-0.3376	0.7389	0.778	0.7724	0.7511
UGT1A3	-0.6271	-0.6339	0.3761	-0.4896	-0.9813	0.1277	0.5108	0.5247	0.5023	0.7063	-0.2957	0.5132	0.5877
IDH3G	-0.6268	-0.4999	0.1911	0.08784	0.05826	0.7975	0.6737	0.9099	0.424	0.9692	0.1876	1.0632	0.8196
DIS3	-0.6262	-0.2762	-0.643	-0.03139	0.1353	-1.1791	0.1443	0.1518	0.2916	0.3943	0.7634	-0.2595	0.05313
ZNF354B	-0.6258	-0.2365	-0.01136	0.4926	0.1749	-0.5589	0.5424	0.95	-0.03301	0.1533	0.4766	1.3454	1.3854
PFN2	-0.6258	-0.8061	0.7164	-0.4454	0.9259	0.9488	0.3173	1.8277	0.3124	1.348	0.2761	1.7882	1.5711
OR1E2	-0.625	-0.1952	0.04605	-0.3718	0.1566	-0.3351	0.3579	-0.02314	0.539	0.5099	0.3866	0.3313	-0.03619
KRT12	-0.6239	0.1034	-0.08672	1.1397	0.9305	-0.1337	-0.1808	0.1023	0.7182	1.3571	0.9179	1.2686	1.7375
SEC23A	-0.6239	-0.2967	0.7068	-1.5089	0.7042	-1.0832	-0.5347	0.288	1.2876	0.05922	0.6649	0.05304	0.909
CC2D1A	-0.6239	-0.3853	-0.5081	-0.2243	-0.4929	-0.5866	0.2539	0.4206	0.3457	0.04873	-0.4661	-0.1049	1.5185
PHLPP2	-0.6231	-0.3864	0.9942	0.1027	-0.491	0.5312	0.3594	1.144	0.632	1.3869	1.651	-0.1891	1.0348
GYS1	-0.623	-0.3806	-0.6926	-0.4641	-0.3012	-0.193	0.3435	0.2266	0.6723	-0.3801	-0.1159	0.1194	0.6781
MUSK	-0.6227	-0.6537	-0.3255	-0.0317	0.02841	-0.7959	-0.04333	0.4229	0.1629	0.3177	-0.814	0.9169	0.7785
THOC3	-0.6203	-1.1646	-1.3711	-1.2593	-0.1744	-1.8459	-2.3651	-0.2291	-0.00366	-0.9504	-0.7745	0.3495	-1.4042
LOC728554	-0.6203	-1.1646	-1.3711	-1.2593	-0.1744	-1.8459	-2.3651	-0.2291	-0.00366	-0.9504	-0.7745	0.3495	-1.4042
DOCK2	-0.6201	-0.1022	-0.155	-0.4108	-0.9991	0.5768	0.2624	0.8192	0.5184	1.1076	-0.3603	1.3187	0.1331
ELMO2	-0.6201	0.01776	0.2706	0.09835	-0.3921	0.02039	0.2952	0.5624	-0.1598	1.0327	0.973	0.1321	0.4285
UBE2Q1	-0.6199	0.6407	-0.2142	-0.7308	-0.3245	-1.1162	-0.1966	-0.1499	0.3674	0.07657	0.7541	0.2386	0.1183
ARL8B	-0.6193	0.05755	0.421	0.4643	0.1078	-0.1167	-0.09477	1.7057	-0.4913	0.5103	0.6889	0.9016	1.2084
LOC391766	-0.618	-0.855	-0.4293	0.9738	1.0564	0.8686	0.005558	1.8921	-0.1287	1.1817	1.8342	1.7639	0.9626
BUB1	-0.6163	-0.1934	-0.7305	-0.3751	-0.1627	-1.0933	-0.8413	0.2726	0.03044	-0.04143	-0.5719	-0.1701	-0.3923
FBXW11	-0.6163	-0.7557	-2.1711	-0.7814	-0.00314	-0.2638	-2.6173	-0.2326	0.4673	-0.5355	0.2312	-0.589	-0.4238
ZNF311	-0.6159	-0.06216	-0.1778	-0.476	-0.6936	-0.8339	0.7354	0.1409	0.2085	0.6923	0.08523	0.4175	-0.00986
UBE2G2	-0.6142	-0.2566	-0.5713	0.9523	-0.3965	-1.4486	-0.9303	0.6364	0.3423	-0.3678	1.115	0.1266	0.2988
ILDR1	-0.6142	0.05235	0.2509	-0.5233	-0.05121	0.8046	0.4786	0.9781	0.04296	0.4792	1.0546	0.8852	0.6554
SLC26A6	-0.614	-0.127	0.2358	0.122	0.2803	0.249	0.3772	0.5289	-0.2582	0.9157	0.9122	0.4814	0.8682
RARS2	-0.6139	-0.5665	1.4109	1.4099	-0.3094	-1.1173	0.1402	1.3291	0.4186	1.4991	0.5016	1.7768	1.3551
SLC27A2	-0.6134	-0.445	-0.365	0.1982	-0.4091	0.7074	-0.3125	-0.2322	1.1816	0.1064	0.6199	0.6565	0.5431
POLL	-0.6123	-0.3838	0.4129	0.5496	0.02346	-0.6339	-0.8799	0.4219	-0.2501	0.109	1.0184	1.1155	0.7529
ETV7	-0.6119	-0.04508	0.801	0.3521	0.203	-0.2981	0.842	1.6305	-0.05502	0.9945	0.801	1.6783	0.8197
CALCRL	-0.6112	-0.994	0.07409	-0.4096	0.4545	1.0747	0.02665	0.9646	-0.1589	0.7076	1.231	0.6734	1.7093
OR52I2	-0.6108	0.5211	0.9161	0.457	0.06328	-0.01013	0.2129	1.4853	0.7555	0.6293	0.08523	0.9233	1.7834
CLDN8	-0.6098	0.02634	-0.00506	0.1732	0.4646	-0.02081	-0.283	0.4255	0.1799	0.7759	0.2935	0.04145	0.4857
MATN3	-0.6095	0.4467	0.7817	-0.1794	-0.3741	-1.0399	0.3847	0.88	0.7648	0.5393	0.839	1.2169	-0.1268

ZBTB39	-0.6095	0.1061	0.4244	-1.1581	-0.02656	-0.3544	-0.02198	0.4484	0.009528	-0.05945	0.6626	0.6116	0.3991
GLRX2	-0.6092	-0.6525	-0.8075	-1.1475	-0.01872	-0.4438	-0.4576	-0.3946	0.1855	0.1096	1.2294	-0.4625	-0.4303
LENG1	-0.609	-0.07654	0.285	-0.2836	-0.04133	0.3055	-0.00601	0.2153	0.01123	0.7865	0.7162	0.1734	0.2599
PML	-0.6088	0.2901	0.2935	-0.3038	0.05273	0.1208	-0.1945	1.0976	0.5704	0.2174	0.7624	0.1594	-0.06457
SOCS5	-0.6077	-0.00099	-0.7153	0.4773	-0.4053	-1.3221	-0.345	0.124	0.2085	-0.4711	0.3	0.8328	0.5231
ZNF585A	-0.6067	0.2814	0.4345	0.9663	0.726	-0.01059	0.5394	2.0319	-0.629	2.2744	1.1218	1.4669	1.7056
TIE1	-0.6063	-0.5742	-0.437	0.1624	0.2791	-1.001	-0.5189	0.5972	-0.05034	0.03724	0.1019	1.1871	-0.2655
PPIL3	-0.6057	-0.3347	-0.3638	0.2443	0.07754	0.1858	-0.898	0.2636	0.6875	-0.2492	0.7748	0.4303	0.01897
CDH7	-0.6057	0.127	0.0222	-1.144	-0.00795	0.2402	-1.2226	0.696	0.5313	-0.0567	-0.3231	0.5997	0.4855
CDC42BPB	-0.6056	0.4129	0.1277	-0.3474	0.2127	-0.4124	-0.5672	0.517	0.4612	0.03096	1.2399	-0.01603	0.2947
UGT1A7	-0.605	-0.534	-0.2845	-0.5506	-0.3494	0.07882	-0.2513	-0.1438	0.5686	-0.4094	0.02647	-0.1668	0.4543
CCRL1	-0.6045	-1.0121	-0.2666	0.4077	0.1855	-1.4882	-0.3973	-0.2677	0.4995	0.5104	-0.5574	1.3728	1.4394
SEPHS2	-0.6042	-0.2317	0.9776	0.4016	1.4947	0.2513	-0.02343	1.1571	0.4001	1.0198	1.1622	1.547	1.3478
TNIP1	-0.6037	0.3345	0.4077	-0.1243	0.0474	-0.3956	0.9067	1.1638	0.542	0.4882	0.3994	0.5853	0.6347
OR4D9	-0.603	0.8801	0.1247	-1.1213	-0.5113	-0.2035	-0.5255	0.000341	0.2158	0.004793	0.8444	0.6743	0.7873
TAF1L	-0.6024	-1.0609	1.2412	-0.03751	-0.1171	-1.0578	-0.8109	0.5145	0.8697	0.2296	-0.3207	0.8086	1.6915
COL9A1	-0.6018	0.007418	0.05206	-1.3738	-0.1535	0.06887	-0.5312	-0.2977	0.1235	0.395	2.0552	0.1591	0.614
HSD17B7	-0.6016	0.003431	0.0902	-0.575	-0.07015	-0.6688	0.1124	-0.1927	-0.216	0.743	0.6781	0.4001	0.2254
MC5R	-0.6013	-0.5055	-0.5217	-0.3745	-0.7646	0.05714	-0.6109	-0.3535	-0.1147	0.2026	0.2779	-0.1435	-0.4891
SLC17A4	-0.6	0.1789	-0.426	-0.1878	-0.3847	-0.5646	-0.1096	-0.1705	0.5051	0.07353	0.2924	-0.2109	-0.02529
PDP1	-0.5996	-0.4478	-0.1029	-0.1406	-0.06566	0.4571	-0.07407	0.3201	0.3455	0.3449	-0.2825	0.4222	0.6143
LMBR1	-0.5994	0.07581	0.03797	-1.3135	-0.1852	-1.3175	-0.3889	0.7383	1.043	-0.7012	0.9997	-0.2935	0.05002
DHTKD1	-0.5994	-0.3581	0.1285	-0.2055	-0.7326	-0.359	-0.7953	-0.2353	0.05841	-0.2066	-0.1093	-0.1777	0.0201
GLUD1	-0.5993	-0.00898	-0.03422	-0.3252	-0.3908	-0.8477	-0.1137	0.2571	0.2715	-0.2253	0.3156	-0.1779	-0.1191
RNF11	-0.5984	0.05616	0.218	-0.5629	0.01561	-0.5655	-0.3174	0.4016	-0.3249	1.4199	0.3612	0.2504	0.04144
OPN4	-0.5982	-0.6129	-1.1896	-0.8893	-0.1945	0.2452	-0.3846	0.5434	0.3622	0.4993	0.6746	-0.7004	-0.4745
DNAJC27	-0.5971	-0.9224	-0.1602	-0.8964	-0.047	-1.504	-0.5722	0.05063	-0.6763	-0.3508	0.6811	-0.1241	-0.1174
ECD	-0.5971	-0.3532	-0.4721	-0.5952	-0.9977	-0.4801	-0.3969	-0.01857	0.08153	0.4016	0.04183	-0.6289	-0.7391
CSN3	-0.5969	-0.5492	0.1018	-0.2715	0.3251	0.003057	-0.1935	0.2291	0.4118	0.5697	0.1946	0.05803	-0.09362
CCDC76	-0.5961	0.02032	0.4382	0.1983	0.224	-0.1587	-0.2136	0.6602	0.2887	0.4459	-0.2217	0.8162	1.6913
UNG	-0.5958	0.6059	0.5506	-0.06114	0.9812	-0.07485	0.6503	1.7405	0.2387	1.2702	1.4544	1.0662	0.4682
SRD5A1	-0.5957	0.313	0.6507	1.2975	0.2186	-0.2046	0.8285	1.5093	0.517	1.7897	1.3744	0.3215	1.7133
PTGR2	-0.5951	-0.3519	0.6198	-0.8492	-0.2254	-1.0187	-0.06401	0.1431	0.8344	-0.04075	0.01041	-0.04003	0.7625
CLK2P	-0.5948	0.05946	-0.03356	-1.2318	0.157	-0.4393	-0.4448	-0.09782	0.303	0.007088	0.1308	-0.06821	0.7059
SNRPA	-0.594	-0.736	-0.3515	-0.0247	-0.3609	-0.6655	-0.615	-0.3692	0.2587	0.03628	-0.4712	-0.3476	0.6566
ENOX2	-0.5937	0.1478	0.5641	-1.6485	-0.384	0.4239	-0.8754	0.7745	-0.04457	0.1495	0.5756	0.4709	0.3873
REM2	-0.5922	0.1792	-0.3849	-0.3721	0.1764	-0.5742	-0.3063	0.4599	-0.265	0.3073	0.9311	0.3181	-0.276
AGTR1	-0.5921	-0.1216	0.01443	0.9269	-0.774	-0.3244	-0.828	0.8419	0.6182	1.3221	1.333	-0.09975	-0.3376
PDE2A	-0.5918	-0.7804	0.9835	-0.09052	0.3515	-0.508	-0.4218	1.3721	0.08207	0.323	1.0931	0.5271	0.2576

APOB	-0.5908	-0.3652	-0.03251	-0.2111	-0.4702	-0.3868	0.1356	1.1266	0.2921	0.4924	-0.2437	-0.4372	0.2386
SETX	-0.5905	-0.1022	0.4634	-0.1696	-0.7909	0.212	0.558	0.5856	0.1715	1.1652	-0.1228	1.3144	0.7921
ANAPC11	-0.5902	0.5688	-0.7185	0.1963	-0.3492	-2.2267	-1.0912	0.1594	0.09954	-0.2778	0.289	0.2526	0.1027
RAB4B-EGLN2	-0.5901	-0.7041	-0.4854	-0.2126	0.3638	-0.0474	0.4264	0.9043	-0.1598	0.04261	0.7941	0.7578	0.1976
NKIRAS2	-0.5895	0.2275	0.1594	0.1372	0.9115	0.224	0.8883	0.9146	-0.2362	1.4164	1.059	1.7792	1.4069
S100A14	-0.5894	-0.3014	0.3579	-0.0356	-0.1002	-1.1505	0.05604	0.6875	-0.1917	1.5683	0.6072	0.8373	-0.3555
MED27	-0.5886	-0.7638	-0.4918	0.2755	0.1759	-1.0695	-0.3434	0.291	0.7794	0.002975	0.03348	0.09553	-0.2935
CRSP8P	-0.5886	-0.7638	-0.4918	0.2755	0.1759	-1.0695	-0.3434	0.291	0.7794	0.002975	0.03348	0.09553	-0.2935
SOAT1	-0.5886	0.3573	0.2861	-0.07933	0.343	-0.1155	0.2184	0.3785	-0.101	0.6681	1.4539	0.4915	0.6606
ABCB9	-0.5883	0.1864	0.02917	-0.06787	0.1359	0.2554	-0.4048	0.5962	-0.1305	0.4145	0.9798	0.6682	-0.03831
ENSA	-0.5882	0.04489	-0.09414	-0.9426	-0.5579	0.2395	0.689	0.3613	0.4066	0.1274	0.4313	0.1618	0.416
BHLHE41	-0.5881	-0.366	0.3122	-0.7949	-0.07946	-0.127	-0.04148	0.4689	0.2291	0.4784	0.1504	-0.4409	0.9134
ZNF10	-0.5877	-0.3072	0.7548	-0.4528	0.00351	-0.706	0.05004	0.3748	0.771	0.08101	0.3883	0.2085	0.1785
BBX	-0.5873	-0.2064	0.6353	-0.1386	-0.5248	-0.3866	-0.1364	-0.00557	1.3231	0.7337	-0.1666	1.1188	-0.04804
BCO2	-0.5871	-0.8703	-0.3557	-0.00457	0.4604	-1.282	-0.3671	-0.06477	1.0195	1.4631	-0.284	-0.2329	0.3894
NINL	-0.5868	-0.5238	-0.1068	0.07331	-0.4666	-0.5485	-0.6327	1.1612	0.7059	-0.1031	-0.4404	-0.2297	-0.1041
CUTC	-0.5867	0.06947	-0.1003	0.6624	0.2227	-0.8915	-0.3182	0.2426	0.8364	0.7914	-0.1558	0.6895	0.4343
COX6A2	-0.5863	-0.8152	-0.3712	-0.1003	-0.8352	-0.5832	-0.6588	-0.5925	0.5285	0.2174	0.2739	0.1956	-0.9537
SNRPF	-0.5859	-1.8558	-0.02873	-0.3239	-0.2574	-1.3257	-2.8714	-0.8378	0.04516	0.5601	-0.2067	-0.6367	0.1631
CCL21	-0.5849	-0.6125	-0.3129	-0.8239	-0.109	-0.6514	-0.1587	-1.0433	-0.2823	0.3603	0.8988	0.09266	1.0966
ZNF286A	-0.5843	0.1323	-0.7632	-0.4605	0.2846	-0.815	-0.7975	0.6154	-0.3021	0.1292	0.4297	-0.3529	0.1433
ARHGAP25	-0.584	-0.6214	-0.3523	-0.1854	-0.5689	-0.8644	-0.4028	-0.1315	0.7282	-0.1974	1.0998	-0.9134	-0.1991
PTPRK	-0.584	-0.665	-0.6399	0.1806	0.2542	0.7292	-0.7614	0.5084	0.2146	0.3073	-0.1609	0.9674	1.1292
ANXA1	-0.5836	0.2124	0.2955	0.7604	0.1108	0.7303	-0.01701	0.5257	0.4386	0.9193	0.3756	0.9357	1.1321
MAPKAP1	-0.5826	-0.3284	-0.3898	1.4139	0.9122	0.3321	-0.3088	0.8467	0.4847	1.2025	0.585	0.9958	1.6238
BAZ2A	-0.5826	0.436	-0.05799	0.681	0.8972	0.2119	-0.5153	0.6419	-0.06149	0.9511	1.4242	1.2627	1.1049
TIAL1	-0.5825	0.341	-0.1889	-0.05789	-0.3317	-0.8972	0.137	1.6371	0.3217	-0.1301	0.0175	0.4442	0.3977
GMFB	-0.5825	-0.5751	0.1263	-0.06653	-0.922	0.2743	-0.9529	0.345	-0.5704	0.003766	0.6981	0.8298	0.2211
A4GALT	-0.5823	-0.4947	-0.6543	0.04724	-0.01926	-0.00552	0.08817	0.2228	-0.04254	-0.08511	-0.03937	0.4632	0.3955
ARHGAP10	-0.5822	-0.2469	-0.1708	-0.7737	-0.2802	-0.4736	-0.7246	-0.6171	0.3652	0.3466	0.1385	-0.5939	0.1718
ZNF740	-0.5818	-0.8276	0.327	0.3892	-0.4081	0.5942	-0.9117	0.5852	0.1601	0.9189	0.6242	-0.2256	1.1669
MC2R	-0.5816	-0.1349	0.8155	-0.9399	-0.5439	-0.634	-0.2334	0.8826	0.295	0.5089	0.0443	0.7312	-0.3817
SLC6A8	-0.5808	-0.2758	0.1702	0.1637	0.09189	-0.8833	-0.2946	0.2452	0.2651	0.7017	0.2097	-0.2625	0.3035
RFX4	-0.5801	-0.3934	-0.7761	-0.5134	-0.3512	-0.1662	0.2214	-0.1842	-0.1779	0.2361	0.0564	-0.2314	0.3143
SLC10A5	-0.58	0.13	-0.7629	0.6741	0.399	-0.2833	-0.2091	0.4171	1.0196	0.005632	0.5351	0.8259	0.2412
AP1S1	-0.5799	-0.8825	0.05606	-0.7845	-0.1434	-0.3719	0.4131	0.5933	-0.1927	0.0592	0.4014	0.4125	-0.1304
ALKBH5	-0.5799	-0.1318	0.003616	0.3778	0.6025	-0.0659	-0.0387	0.3377	1.0387	0.3729	0.5459	1.1861	-0.07161
EBF1	-0.5797	-0.4067	-0.3133	-0.08594	-0.5911	-0.1819	-0.6822	-0.7877	0.4324	-0.4698	0.4082	0.2264	1.1613
ZNF445	-0.5795	0.09417	-0.9368	-0.1882	-0.9118	-0.203	-0.5579	0.07537	-0.02172	-0.3306	0.137	-0.3867	0.07316

RWDD3	-0.5794	-0.3993	-0.6254	-0.6431	0.631	0.2453	0.5394	0.6852	0.6919	0.4031	-0.2704	0.8232	1.0209
TMEM56-RWDD	-0.5794	-0.3993	-0.6254	-0.6431	0.631	0.2453	0.5394	0.6852	0.6919	0.4031	-0.2704	0.8232	1.0209
PIK3C2B	-0.5793	0.3684	0.07176	-0.3366	-0.2727	0.7957	-0.3115	0.1117	1.1027	0.4967	0.3579	0.7394	0.3192
NCOA3	-0.5792	-1.2739	-0.1728	-0.7968	-0.2877	-0.6216	0.3297	-0.0882	0.3672	-0.6422	0.3478	0.05642	0.5739
TNNI3K	-0.5791	-0.6972	0.3566	0.1531	-0.08335	0.1254	-0.6016	-0.00381	-0.454	0.8634	0.8784	0.7627	0.6059
TAL1	-0.5775	-0.1362	-0.4259	-0.2193	0.06627	-1.1539	-0.1421	-0.03046	0.4989	-0.1342	0.8407	0.2411	-0.3825
NAMPT	-0.5772	-0.1679	-0.1383	-0.9888	0.3153	0.02581	-1.0439	-0.04288	0.3888	0.6291	-0.3817	0.506	0.1402
LSM1	-0.5772	-0.6	0.364	0.1636	0.1912	-0.3329	0.2861	-0.3504	0.3018	0.8118	0.7506	1.0999	0.55
TRPM4	-0.5764	0.0491	-0.4364	0.5665	0.1695	-0.7272	-0.6076	0.394	0.6512	0.4631	0.8675	-0.3566	0.2037
STX3	-0.5757	-0.8841	-0.2859	0.2232	0.3317	-1.7447	-0.1897	0.368	0.2489	1.1635	-0.1614	-0.1659	0.3652
TONSL	-0.5757	-1.0422	-0.3945	-0.688	-0.04595	-1.4581	0.2284	0.4361	0.2149	-0.1748	-0.2955	0.5758	-0.5022
RALY	-0.575	-0.1576	-0.08851	-1.4369	-0.2265	-1.5489	-0.4787	-0.1903	-0.06566	-0.08634	0.07905	-0.1496	-0.5314
EBPL	-0.575	0.2772	-0.2001	-0.01525	0.4048	0.4128	-0.7848	0.05609	0.255	0.2583	0.7285	0.7775	0.6541
UBLCP1	-0.5746	-0.1647	0.6385	-0.1217	-0.3395	-0.2932	-0.5198	0.633	0.05837	0.7849	1.1963	0.08832	-0.2771
ALG10	-0.5742	0.05468	0.4151	-0.4623	0.07029	-0.3075	-1.1386	-0.3361	0.1389	0.2596	1.2137	0.682	0.3488
CTRL	-0.5741	-0.476	-0.3363	0.5243	-0.2319	-1.1583	-0.9386	0.05547	-0.4627	0.8366	0.2404	-0.2143	1.7386
GPR179	-0.574	0.3769	-0.3078	-1.2841	-0.06438	-0.5672	0.3688	0.3331	0.9084	0.8303	0.02363	-0.02359	0.05891
MCM6	-0.5738	0.9491	0.7165	1.4352	0.3933	-0.4405	0.5443	1.5405	0.3284	1.458	1.452	1.0025	1.7427
CYP51A1	-0.5737	-0.4567	-0.6688	0.237	0.1914	0.5781	-0.2191	0.3143	-0.3377	0.5654	0.9634	0.5209	0.8622
ACP5	-0.5729	-0.8489	-0.5775	0.232	-0.7892	-1.1005	-0.7794	0.3167	0.1724	-0.3709	-0.03073	-0.3626	-0.6947
PGM2	-0.5728	-0.05637	0.5677	0.2256	-1.0601	-0.1125	-0.0767	0.01649	1.1675	0.7919	0.185	0.638	0.1151
ZNF224	-0.5727	0.4363	0.1487	-0.9366	0.7311	0.6794	0.4309	0.5853	0.481	1.2832	1.8859	1.1322	0.3005
LALBA	-0.5722	-0.6864	0.519	-0.3289	0.1726	-0.1968	-0.5962	0.5432	0.2279	0.4669	0.7135	-0.4537	0.3733
NTF3	-0.5721	-1.5782	-0.5619	-0.4533	-1.2361	-0.5616	-0.8254	0.4765	-0.0431	-0.8302	0.1181	-0.2763	-1.0935
DDX59	-0.5719	0.1624	-0.2621	-0.3749	-0.4681	0.241	-0.6473	0.9571	-0.3889	0.3348	-0.123	0.2537	0.4347
ZSCAN29	-0.5715	0.2878	0.2654	0.03423	1.0609	-0.7686	-1.4988	-0.4132	0.4753	0.8373	1.5152	1.5533	1.0207
LOC100508943	-0.5699	-0.0749	-0.7261	-0.5609	-0.294	-0.7811	-0.4578	0.2066	0.2256	0.7708	-0.5309	-0.6893	-0.1188
SLC39A1	-0.5696	0.8406	0.3772	-0.2815	-0.2302	0.2437	-0.1488	1.7225	0.3709	1.1289	0.3947	0.4846	0.201
UBR2	-0.5695	-0.9031	-1.1504	-0.5666	-0.6108	-0.3109	-0.3273	0.07508	-0.2297	-0.01817	-0.534	-0.7264	-0.2736
BCAR1	-0.569	0.2903	-1.1888	0.6874	-0.8	-1.2715	-0.5529	-0.1163	0.1772	0.4352	-0.04331	0.6641	-0.1182
HSPB8	-0.5669	-0.5133	0.1946	-0.7776	0.4223	-0.8119	-0.2764	-0.2094	0.1426	0.1459	0.4455	-0.09378	0.5176
DGCR2	-0.5667	0.3615	1.008	0.4973	-0.2132	-1.4234	0.1005	0.3084	1.0047	0.1983	1.4124	1.0293	0.7804
OR51T1	-0.5657	-1.0658	0.4789	-0.07855	1.08	0.2797	-0.1431	0.594	0.6169	1.5058	0.07315	0.82	1.0004
PHLPP1	-0.5656	0.2635	-0.0742	0.02948	0.1488	0.2661	-1.1373	0.4292	0.9563	0.3288	-0.2364	0.5155	0.6617
WISP1	-0.565	0.3111	-0.2686	-0.01719	-0.567	-0.4891	-0.5611	0.1092	-0.0189	-0.1869	-0.2401	0.6242	1.099
SEC23IP	-0.5648	0.08158	-0.1597	0.001422	-0.106	-0.8424	-0.2645	0.2736	0.6655	-0.04932	0.9723	0.379	-0.5721
RHAG	-0.5648	0.1142	-0.08538	-0.6082	0.2355	-0.06025	0.3612	0.6844	-0.01396	1.2076	0.6796	-0.4171	1.1671
LRRN2	-0.5646	-0.7206	0.3229	-0.0617	0.069	0.9009	0.09888	0.8553	0.2219	0.8173	-0.04191	1.3611	0.9079
GMEB1	-0.5638	-0.1789	0.7175	0.2042	-0.4416	0.06768	0.6182	0.9434	0.02474	0.1943	1.0037	0.7481	1.1605

TXNDC8	-0.5635	-0.1562	0.9174	0.5252	0.3736	-1.0213	-0.198	0.01453	1.3536	0.8052	0.4895	1.1421	0.5721
CSNK2B	-0.5624	-0.727	-0.4215	-0.8845	-0.4138	-0.2469	0.02357	-0.273	0.3803	-0.05956	-0.03038	-0.5602	0.03783
P2RY6	-0.5621	0.08706	-0.4692	-0.0988	-0.4566	0.3879	-0.247	0.1492	-0.2994	1.286	0.07252	0.9837	0.1749
SPEG	-0.5617	0.5654	0.7858	-0.2988	-0.08074	0.209	0.03168	0.9224	0.4534	0.6519	1.0976	0.1059	0.5417
PPYR1	-0.5616	0.4619	0.6819	-1.3461	-0.2293	0.1015	0.3877	0.3923	0.8202	0.6374	0.9042	0.06954	0.7741
PEX19	-0.5614	-0.2548	0.8721	0.09214	-0.9623	-1.5091	0.2255	0.01223	0.2419	1.7082	0.3494	0.9216	0.2499
TTLL4	-0.5614	-0.837	-0.4207	0.1714	-0.8492	0.5208	0.2018	1.1008	0.4329	0.804	-0.3932	-0.07038	0.819
BCL9L	-0.5609	0.3276	0.4279	-0.4186	-0.6851	0.3676	-0.4942	1.0452	0.789	0.674	0.2883	-0.1837	0.1465
BZRAP1	-0.5608	0.1045	-1.0287	0.6207	0.3539	0.9392	0.02891	1.5222	0.1379	1.278	0.1363	1.5209	0.8703
RWDD3	-0.5606	0.3012	-0.01979	0.5714	-0.4832	-0.4334	-0.3176	0.009448	-0.03828	0.4278	1.0094	0.5325	0.4057
TSHZ3	-0.5599	-0.1847	-0.1691	-1.1428	-0.1577	-0.6868	0.3755	0.6133	0.5234	0.03761	1.2422	-0.7542	0.3601
FPR2	-0.5598	0.2801	-0.4612	-0.697	0.2257	-0.2788	-0.7184	-0.1228	-0.07103	0.2555	-0.1663	0.391	0.5745
TBCK	-0.5596	0.205	0.233	-0.488	0.09602	-0.2889	0.2306	0.4855	-0.09614	0.2523	-0.02127	1.0151	1.1481
ATP6V1F	-0.5595	-0.6656	0.4089	-0.3919	-0.3121	0.3506	-1.0082	0.3955	0.9488	0.5142	0.2878	0.1194	-0.4511
LOC100505587	-0.5595	-0.6656	0.4089	-0.3919	-0.3121	0.3506	-1.0082	0.3955	0.9488	0.5142	0.2878	0.1194	-0.4511
CNOT8	-0.5582	-0.3043	0.5584	-0.2661	0.3418	-0.3173	-2.1559	1.0331	0.3248	0.7071	0.5307	1.1373	-0.586
ZBTB22	-0.5574	0.04368	-0.4712	-0.6928	-0.1479	0.6561	0.09817	0.3295	-0.2999	0.3107	1.4982	0.587	0.6064
TXNRD1	-0.5571	-0.0742	0.161	-0.04658	-0.01027	-0.4161	-0.4083	0.9209	0.2903	-0.2176	-0.2636	0.4006	0.314
USP37	-0.5568	-1.2133	0.01589	-0.9925	-0.555	-0.5451	-1.3166	-0.2837	0.5924	-0.241	-0.3187	-0.9606	-0.0467
LOC100290936	-0.5567	-0.08351	-0.5687	-0.2849	-0.7632	0.2167	-0.1147	0.2617	0.9851	-0.2703	0.1914	-0.2244	0.1526
PAICS	-0.5566	-0.00013	-1.0409	-0.1161	0.4176	-0.2161	-0.7326	0.3965	-0.3401	0.6227	-0.1537	1.2412	0.2004
UGT2B4	-0.5565	-0.05662	0.8517	0.339	1.1757	0.2668	0.1987	1.7399	0.07782	0.2036	1.6645	2.0961	1.3526
KRT3	-0.5564	0.0604	-0.05476	0.2758	-0.2677	-0.3912	-0.6628	0.1654	-0.2415	0.4675	0.5372	0.6664	-0.2094
PLA2G10	-0.5564	0.1762	0.2691	-0.02205	0.3319	-0.6957	-0.4665	0.4482	-0.009	0.9591	0.6908	0.02935	0.1765
CASP14	-0.5564	-0.5698	0.09626	-1.7694	-0.926	0.1259	-0.01103	-0.1884	0.454	0.06544	0.8315	-0.6288	0.9245
ST6GALNAC6	-0.5563	-0.2749	-0.2815	-0.5539	0.3711	-0.6652	-0.1215	0.3383	-0.1978	0.9513	0.1238	0.09834	-0.1939
C15orf42	-0.5558	-0.831	-0.07856	-0.05648	0.03867	-0.5511	-0.7942	0.04269	0.9365	-0.4232	0.8569	0.3687	-0.6016
PKN1	-0.5553	-0.1026	0.361	-1.8089	-0.3042	0.3241	0.02692	0.1345	-0.0829	0.3707	0.6586	1.1761	0.3822
RAGE	-0.5542	-0.3098	0.519	1.344	0.6632	1.2248	0.4075	2.165	-0.4583	0.9983	1.739	2.3381	4.0214
SLC22A1	-0.5541	-0.1231	-1.2866	0.8251	0.4855	0.2323	-1.4041	0.6861	0.6262	0.827	0.3627	-0.09109	0.4932
CCNB1IP1	-0.5527	-0.2781	0.06567	-0.3053	0.3826	-0.1329	-0.3775	0.1889	-0.8305	1.0841	0.7157	0.5417	0.8982
CDC42EP2	-0.552	-0.523	-0.4064	-0.2277	-0.3508	-0.0193	0.4381	-0.07221	0.5695	0.4585	-0.4887	0.632	0.4276
GUCY2E	-0.5519	-0.6275	-0.3067	-0.04743	-0.2361	-0.3727	0.1894	-0.4117	-0.3879	0.6732	0.9805	0.4962	0.07788
SNRPE	-0.5519	-0.7639	-0.441	0.9699	0.2984	-1.5201	-1.7663	0.1022	0.5689	0.8595	-0.1834	0.5203	-0.182
CLTB	-0.5517	0.03209	-0.7342	-1.4604	-1.3331	0.9635	-0.9223	0.1632	-0.3762	0.2588	0.4889	-0.2278	0.4904
MMAA	-0.5514	0.7333	1.7641	0.2692	0.8288	-0.5011	0.5794	2.0214	0.295	1.6663	1.7635	0.9198	1.5908
SLC41A1	-0.5514	-0.09209	-0.1603	-0.00504	-0.3959	-1.059	-0.2191	0.1937	0.002559	-0.4316	0.5254	0.1204	-0.0327
OR4C11	-0.5513	-0.607	-0.5109	-0.3293	0.8621	-0.2273	-0.2803	0.7171	-0.3688	-0.1587	0.2733	1.1263	1.4739
NACA2	-0.5513	-0.4791	-1.1456	0.1706	-0.6639	-2.5398	-1.5229	-0.2425	0.3435	-0.2097	-0.3944	-0.1322	-0.9984

EFCAB7	-0.5511	-0.076	-0.5511	-0.4798	-0.1852	-0.5437	-0.1789	0.114	0.5189	-0.1249	-0.0637	-0.1782	-0.4779
UGT1A5	-0.5504	-0.3749	0.1209	-0.4066	0.5015	-0.4032	-0.4794	0.8187	0.3056	0.5354	-0.2887	-0.1869	0.5276
TRIM13	-0.5502	0.9011	1.4617	-0.3939	-0.6265	-1.0062	-0.1322	1.6408	-0.5248	1.3635	1.7841	0.4048	1.7708
EDEM2	-0.5498	-1.1033	0.0116	-0.2783	0.4244	0.2496	-0.9279	-0.1339	0.4203	0.007143	1.4314	-0.1531	1.0998
DNTT	-0.5498	-0.2617	-0.6111	-0.6026	-0.1696	-0.4236	0.07047	1.2635	-0.1374	0.2242	0.1736	-0.9491	0.8503
KCNJ4	-0.5497	0.5947	1.2179	2.3837	0.9005	1.1455	0.6351	1.8424	0.4694	2.041	3.43	2.2305	2.1572
SEC24C	-0.5476	0.1061	0.2886	0.2472	-0.1958	-0.3952	-0.1563	0.2101	-0.5774	0.6294	0.3631	1.1847	1.1418
ADAMTS6	-0.5466	-0.3047	-0.1206	0.1034	-0.667	0.7149	-0.03046	0.3598	0.7756	0.6182	0.5753	-0.0571	0.03364
TGM7	-0.5462	0.2383	-0.5501	0.2507	-0.5825	-0.06216	-0.9497	0.7604	0.2216	0.6078	0.6982	0.1803	-0.7113
PAX7	-0.5459	0.2476	0.4408	1.331	-0.2481	1.4612	1.9711	2.1108	0.5426	2.0614	1.139	2.226	2.2148
PNCK	-0.5456	0.07244	-0.00559	-0.4121	-0.6745	0.2709	-0.3435	-0.02	-0.00628	0.05754	0.5471	0.1501	0.03562
RNASE2	-0.5455	-0.2259	0.4326	-0.3048	0.4998	-0.3006	-0.3553	0.7149	-0.377	0.7199	0.5915	0.1612	0.6789
AGAP7	-0.5454	-0.3056	-0.3266	-0.128	-0.01277	1.0064	-0.04176	-0.1563	1.8787	0.5101	0.7169	0.2336	0.9026
SUDS3	-0.5453	-0.6372	0.3864	-0.8394	-0.3287	-0.2481	-0.296	-0.01707	0.118	0.7027	0.9128	-0.5343	-0.03868
H2BFM	-0.545	-0.0292	0.3952	-0.1919	0.09811	0.4168	-0.4624	0.2009	0.4363	0.3552	-0.00384	0.9801	0.454
SYT15	-0.5439	-0.5262	-0.1234	-0.3611	-0.3163	-0.5313	-0.349	-0.8387	-0.01728	0.155	0.5404	-0.2523	0.2647
PCYOX1L	-0.5437	-0.06397	-0.1294	0.2142	-0.3911	0.1983	-0.4545	-0.01325	0.5716	0.1121	-0.3338	0.8364	0.5525
USF2	-0.5437	-0.4205	-1.0792	0.3209	0.09068	-0.4427	-0.5354	0.252	1.136	-0.1608	0.0266	0.5306	-0.4275
APC	-0.5433	0.3473	-0.05531	-0.0314	0.2578	-0.2975	-0.3499	-0.00179	0.3819	0.3825	0.1359	0.322	0.1033
PCDHGB4	-0.5427	-0.6396	1.0021	0.1056	-0.1905	2.0834	0.1262	1.9557	-0.8091	1.7098	1.469	3.133	2.692
TOMM22	-0.5427	-0.7417	-0.2877	-0.02011	-0.02968	-0.01676	0.04635	0.2203	0.6008	0.5724	-0.6579	0.7196	0.1271
SMPDL3A	-0.5423	0.002455	0.3588	-0.5952	0.4343	-0.1585	-0.1977	0.427	0.8022	0.003941	0.5165	-0.08292	0.5254
HNRNPM	-0.5413	-0.7231	-1.3281	-0.5025	-0.4313	-1.9351	-1.2653	0.2357	0.4724	0.1002	-0.4559	-1.824	-0.1413
CREG1	-0.5408	0.02444	0.1341	-0.006	0.1938	-1.0628	-0.5111	0.6678	0.7605	0.5196	0.1322	0.04932	-0.3685
CACNA2D1	-0.5406	-0.07873	0.458	-0.318	0.06965	-0.7838	-0.4439	0.4172	0.1749	0.3881	0.2789	0.3035	-0.3446
YSK4	-0.5405	-0.04167	0.9576	0.1887	-0.7657	-0.7156	0.3876	1.0927	-0.2954	0.841	1.1307	0.1907	1.1616
SLC2A4	-0.5399	1.0042	0.7989	0.0404	0.4448	-1.2016	-0.3969	1.4781	0.5184	0.3241	0.2536	1.2982	1.2485
SGPP1	-0.5396	0.1228	0.4428	0.293	-0.1756	-0.1063	-0.4429	0.7774	0.7012	0.7963	0.1641	0.09097	-0.07346
KCNJ2	-0.5391	-0.3655	0.6396	0.6488	-0.3571	0.4145	0.7092	1.1792	-0.5464	1.7065	0.9584	1.9234	0.9241
HES3	-0.5381	-0.3128	-0.933	-0.7681	0.3479	-0.2786	-0.2293	-0.1739	-0.00521	0.2133	0.2737	-0.1984	-0.1558
EFNB1	-0.5381	-0.4025	0.403	-1.1071	-0.3969	0.2127	-1.1755	0.2373	-0.2476	1.2682	0.6941	0.03272	-0.3594
WNT1	-0.5379	0.3529	0.1163	-0.5284	-0.4225	0.000238	-0.6394	0.5018	-0.4933	1.0213	0.003007	0.2349	0.5831
NFKBIA	-0.5372	-0.5786	-0.503	-0.9541	0.2633	-1.4663	-0.2237	-0.194	0.4372	0.1127	0.9997	-0.8697	-0.01271
ACAT2	-0.5371	0.1384	-0.3168	1.5247	0.4582	0.6958	0.08068	2.115	-0.3043	1.7398	0.9229	1.5925	1.317
KIR3DS1	-0.5371	-0.4527	-0.07088	-0.1872	-0.3722	-0.5926	-0.1291	0.08447	-0.3805	0.4169	-0.3114	0.4386	-0.2207
LDHAL6B	-0.5369	-0.9418	0.709	0.8137	-0.2393	-0.5263	0.05793	1.2724	0.2203	0.9388	-0.1757	0.8298	0.6997
CD79B	-0.5366	0.2789	-0.3537	-0.0142	0.437	1.2693	-0.4185	1.26	0.2157	0.4682	0.6034	1.706	0.728
GPX3	-0.5362	-0.1492	-0.5858	-0.1343	0.2636	-0.4621	-0.8027	0.2435	-0.2914	-0.498	0.4995	0.3072	0.4032
GPD1	-0.5362	-0.3249	-0.6115	-0.4656	-0.375	-1.0888	0.6579	-0.07882	0.2615	0.5099	-0.1606	0.7862	-0.312

MLKL	-0.5361	0.1077	0.01984	-0.8	0.2429	-0.3716	-0.3283	-0.05331	0.5261	-0.377	0.7208	0.6784	0.05727
HNRNPCL1	-0.5356	0.1064	0.2858	-0.6108	0.2886	-0.6142	-0.3857	-0.2567	0.3421	0.5616	0.5563	0.1265	0.1287
HERPUD1	-0.5356	0.1588	0.4095	0.8366	0.01803	-0.01436	-0.2517	0.9596	0.2712	0.5386	0.4755	0.2569	0.7871
IARS2	-0.5355	-0.9054	-0.9827	0.4694	-0.1336	-1.3997	-2.1923	-0.5931	0.3826	-0.1314	-0.6029	-0.1971	0.5773
LOC100507855	-0.5355	-0.6791	-0.4096	-0.5602	0.1069	-0.5665	-0.2275	0.6328	0.2051	-1.1293	-0.2041	0.5469	0.9288
LOC100293160	-0.5354	-0.4713	-0.5887	-0.5788	-0.07976	-0.3396	-0.3398	-0.1038	0.2529	0.08613	-0.6569	-0.1472	-0.22
ZNF765	-0.5354	-0.2407	-0.3266	-0.05654	0.09979	-0.5267	0.06202	0.1036	0.5089	-0.04183	0.5131	0.3434	-0.443
PRDM2	-0.5352	-0.4947	-0.01348	0.4356	0.6647	-3.0704	-0.7527	0.8047	-0.09267	0.2056	0.752	1.4629	-0.07185
GTF2IRD1	-0.5352	-0.03254	-0.1489	0.4918	0.13	-0.7321	0.1472	-0.1317	1.0656	0.2862	0.09743	0.3577	1.3309
DDX24	-0.5349	-1.0678	-0.3832	-0.08447	-0.7196	0.1608	-0.09225	0.4459	-0.3173	0.11	-0.416	0.3512	0.2636
ALOX5AP	-0.5331	-0.07816	-0.7176	0.0459	-0.5378	-1.6489	-0.1624	-0.1477	0.7206	-0.517	-0.538	0.7786	0.5872
SPIC	-0.5313	0.5387	0.9254	-0.2423	-0.2369	-0.5905	0.01328	0.9412	-0.03145	0.01938	1.4144	0.4958	1.4934
IQCJ-SCHIP1	-0.5305	0.5168	0.7506	-0.00791	-0.01761	-0.7915	-0.0274	0.4007	-0.1104	0.8074	0.4502	0.7876	1.4545
PCDHB14	-0.53	-0.2402	0.1666	-0.6054	0.9511	0.04962	-0.4355	0.4841	0.7518	0.3508	0.8019	-0.1458	0.4979
ECHS1	-0.5286	-0.3643	-0.7534	-0.5549	-0.09365	-0.4093	0.2923	-0.08681	0.6113	0.3893	0.8339	-0.2813	-0.501
GLMN	-0.5285	-0.5485	0.8686	-0.4865	-0.3596	0.8112	-0.3662	1.4096	-0.5952	0.9978	0.3914	2.0831	0.6453
FRMD1	-0.5285	0.1416	-0.07727	1.115	0.000571	-0.5304	-1.2205	0.5021	1.0662	0.1703	0.9327	1.5602	-0.264
FH	-0.5284	-0.00834	-0.8295	0.02518	0.8059	-0.07402	-0.2953	0.6337	0.1033	0.5742	0.3888	0.5328	-0.04821
RHO	-0.5277	-0.3154	0.8438	0.2238	0.4112	-0.5919	-0.4028	1.0924	-0.4347	-0.1137	1.0875	1.3318	1.5686
PAMR1	-0.5265	-0.385	0.1725	-0.05901	0.3991	0.1316	-0.1089	0.5793	0.4526	0.7882	0.08361	0.8399	-0.3237
TNFRSF10A	-0.5257	0.1114	0.0541	-0.9057	-0.7845	0.02814	0.4013	-0.2373	0.8627	0.7012	-0.2338	0.8111	0.2788
PCDHGB7	-0.5257	0.6859	1.468	1.2752	0.744	2.2718	-0.07117	2.2857	-0.144	2.7312	1.8503	3.9066	2.4736
QRT1	-0.5254	-0.7866	-0.02687	0.002262	-0.6619	-0.2325	-0.1005	0.1893	0.619	-0.09856	-0.2953	-0.2094	0.1114
ALG1	-0.5251	0.8431	-0.1177	0.08425	-0.4014	-1.1289	-0.1466	1.2909	0.301	0.9846	-0.1887	-0.1463	0.8723
LOC650368	-0.5251	0.8431	-0.1177	0.08425	-0.4014	-1.1289	-0.1466	1.2909	0.301	0.9846	-0.1887	-0.1463	0.8723
GRIK2	-0.5246	-0.03935	0.79	-0.1261	0.5461	-1.3081	-0.9974	0.8863	0.2992	0.2036	0.03651	1.1568	0.2766
NEIL3	-0.5243	0.4008	-0.4452	-0.407	0.2058	-1.0028	-0.2244	1.1663	-0.07003	1.6105	-0.2922	-0.2028	0.3765
GLUD2	-0.5243	0.27	0.1295	-0.5907	-0.375	0.2021	0.2242	0.7894	0.1918	0.4936	0.1767	-0.07732	0.3768
GFI1	-0.5242	-0.7351	-0.06699	0.463	-1.1318	-0.1354	-0.1744	0.3899	-0.08098	0.5727	0.3398	-0.5357	0.8237
POLR3C	-0.5239	0.3168	0.9089	-0.2008	-0.4503	1.0185	0.6895	1.4811	-0.3262	1.0513	0.7353	2.0529	1.9899
EPHA6	-0.5229	-0.6694	0.2716	0.5089	1.0056	0.2223	-0.05763	1.1059	-0.4155	0.9934	1.0552	0.879	1.451
RHBDL3	-0.5226	0.2539	0.4365	-0.01703	-0.2036	0.3083	0.1632	0.9619	0.05877	0.1961	1.2267	0.9529	-0.01948
RICTOR	-0.5226	-0.2535	-1.6568	-1.4772	-0.7343	-0.3644	-0.1128	-0.4931	0.4951	0.4041	-0.1039	-0.09708	-0.9964
ANGEL2	-0.5223	-0.2784	0.4059	0.1854	0.4473	-0.3483	0.3614	0.4031	0.2318	1.0998	0.2086	0.9696	0.2356
CLN5	-0.5223	0.6421	1.1554	0.9661	0.6559	1.0852	0.531	1.5835	-0.09253	1.7129	1.1945	1.5757	2.9594
ZFP91	-0.5223	0.1869	-1.1941	-0.3965	-0.5771	-1.0675	-0.589	0.31	0.5177	-0.5097	0.361	-0.5845	-0.5434
EHMT2	-0.5221	0.1095	0.3382	-0.2946	0.4847	-1.0013	-0.6913	1.1346	-0.2315	-0.00423	0.22	0.3699	1.0578
TMPRSS3	-0.522	-0.53	0.08757	-0.3599	-0.7188	0.6119	-1.2264	-0.2226	0.4223	0.4578	0.2198	0.06451	-0.166
SLC30A7	-0.5219	-0.6022	-0.3288	0.4254	0.4999	-1.6403	-0.1277	0.5895	-0.2116	-0.02472	0.06572	0.8737	0.9246

STON1-GTF2A1L	-0.5215	0.2639	-0.3004	-0.8479	-0.1778	-0.3931	-0.1088	0.2234	-0.00217	1.1548	0.42	-0.3586	-0.1713
SLC1A1	-0.5212	0.07549	-0.03064	-0.03046	0.001155	0.437	-0.4279	0.2817	-0.1079	0.4604	0.5876	0.2659	0.1574
KLF14	-0.5207	-0.4388	-0.2066	0.09495	-0.8382	-0.6414	-0.4585	-0.1706	-0.1218	-0.04295	0.3156	-0.1442	-0.4914
CKS1B	-0.5207	-0.1919	-0.01961	-0.3701	-0.4275	-0.429	-0.7142	-0.5542	-0.01339	1.7635	0.7623	0.1167	-0.6573
CDKN1B	-0.5206	0.7962	-0.1258	-0.4216	-0.1704	0.0997	-0.4547	0.933	-0.1993	0.7878	-0.1698	0.4329	1.1987
CD320	-0.5204	-1.108	0.6069	0.2513	0.245	-0.2046	-0.3761	0.4785	0.1803	0.4126	0.4886	0.1936	0.09424
BLVRB	-0.5202	0.2581	0.6175	-0.1957	0.1106	0.05749	0.003283	1.4247	-0.5154	-0.09952	1.5166	1.1024	0.8983
ZFPL1	-0.5201	0.25	0.8381	0.1649	0.5173	-0.3948	0.1383	0.4498	0.2485	0.8169	0.5394	0.5894	1.3144
MCF2	-0.5197	-0.7571	0.7383	-0.4398	-0.1509	-1.0772	0.3376	-0.1954	0.8187	-0.1931	0.5187	0.4507	0.7965
FDXR	-0.5193	-0.3255	-0.191	-0.7237	-0.1926	0.1414	-0.743	-0.1071	0.3567	0.6898	0.01345	0.7449	-0.8307
ZSCAN4	-0.5188	0.00538	-0.3129	-0.2333	-0.1626	-0.7533	-0.1545	-0.1541	0.9958	-0.2246	0.304	-0.04877	-0.1986
ZNF671	-0.5186	0.644	0.5903	-0.9658	-0.04281	-1.5934	-0.6862	0.7558	0.57	-0.2164	0.3861	0.079	0.2408
OR1E2	-0.5186	-0.5732	-0.1049	0.2118	-0.5841	-1.3155	-0.5108	-0.5677	0.202	0.3319	0.2787	-0.4666	0.2089
CHPT1	-0.5185	-0.2822	0.3645	-0.223	-0.3622	0.4763	-1.1502	0.4581	0.0964	0.9495	-0.3699	0.5392	0.3538
TRPV5	-0.5184	-0.1951	0.4922	0.03707	-0.7873	-0.242	-0.4928	-0.6667	1.0483	0.1608	1.2083	0.1142	0.4486
TMC7	-0.5183	-0.05877	-0.358	-0.6337	0.1265	-0.3221	0.1997	0.3022	1.0798	0.6545	0.04979	-0.7042	0.444
AHRR	-0.5176	-0.2219	0.6625	0.5168	-0.01405	0.6	0.6551	0.5583	-0.347	1.033	1.3574	1.5019	1.5695
LRP6	-0.5175	0.367	-0.03146	0.1526	0.4265	0.4323	0.2709	1.2207	-0.117	0.5801	0.4668	0.8581	0.552
PHB	-0.5173	-0.4182	-0.7181	-0.8659	-0.5577	-2.2594	-1.0712	-0.4748	0.5776	0.7296	-0.628	-1.6433	0.4855
DPCR1	-0.5172	-0.07356	0.566	0.4771	-0.1086	-1.5745	-0.04839	0.5161	0.07202	0.5113	0.3134	0.9222	0.2123
DHX16	-0.5168	-0.2056	-1.4052	-0.398	0.03236	0.1597	-1.614	-0.2328	-0.3505	0.3232	0.09318	-0.00274	-0.1645
GNB2	-0.5164	-0.06471	-0.09746	-0.2902	-1.3633	1.0644	-0.6516	0.8666	0.3705	-0.6517	1.4604	0.7128	0.4754
PLSCR2	-0.5154	-0.263	-1.0756	0.5728	0.3702	-0.8768	-0.1579	0.6548	-0.08906	-0.02968	0.2112	0.28	0.4348
PBX4	-0.5154	-0.462	-0.8108	0.1578	0.08704	-0.5353	-0.4567	0.06541	0.5335	-0.6161	0.257	-0.2166	0.5047
ATP2C1	-0.515	-0.582	0.3828	1.2675	0.1161	0.09491	0.1629	0.7943	0.6996	1.6424	-0.3607	1.5294	1.2665
GPR32	-0.5149	-0.6062	-0.2908	0.6491	0.6808	-0.00516	0.01409	0.753	0.1332	0.04315	0.9595	1.2929	0.362
TCEB2	-0.5148	-0.339	-0.5026	-0.3801	-0.3644	-0.4707	-0.3057	-0.3705	-0.2356	0.4541	0.413	-0.8165	-0.0716
AGAP4	-0.5141	-0.3928	-0.3705	0.4428	0.3072	0.3286	-0.3482	-0.3177	1.4258	0.5426	0.8085	0.04105	0.5795
AGAP8	-0.5141	-0.3928	-0.3705	0.4428	0.3072	0.3286	-0.3482	-0.3177	1.4258	0.5426	0.8085	0.04105	0.5795
SOCS4	-0.5139	0.2695	0.3725	-0.08329	-0.2177	-0.05249	-0.2463	0.9126	-0.03118	0.1508	0.1115	0.243	0.501
TMC5	-0.5138	-1.3868	-0.2311	0.1935	-0.7407	-1.033	-0.3863	0.325	-0.622	0.2584	-0.1022	-0.4918	0.002835
PTPRZ1	-0.5133	-0.2172	-0.2722	0.4299	-0.4122	-1.2599	-0.5558	-0.01024	0.6447	-0.4299	-0.04822	0.4132	-0.00114
C14orf132	-0.5132	0.1014	-0.1658	0.4801	0.4637	0.7095	0.3832	1.3886	-0.2851	1.1546	0.2567	1.1917	1.3559
TDGF1	-0.5131	0.00122	-0.2208	0.03395	-0.1132	-0.03856	0.2568	0.6968	0.8195	0.7	-0.1017	-0.5484	0.5398
CDK18	-0.5124	-0.7232	0.0348	-0.6005	0.5695	-0.6629	-0.1041	1.0957	-0.1738	0.02261	-0.05752	0.3211	0.2742
FCGBP	-0.5113	-0.2032	0.1422	-0.2666	-0.4136	0.04624	-0.561	0.01362	0.1561	0.2887	-0.2702	-0.1341	0.1436
LOC100133944	-0.5113	-0.2032	0.1422	-0.2666	-0.4136	0.04624	-0.561	0.01362	0.1561	0.2887	-0.2702	-0.1341	0.1436
LOC100290309	-0.5113	-0.2032	0.1422	-0.2666	-0.4136	0.04624	-0.561	0.01362	0.1561	0.2887	-0.2702	-0.1341	0.1436
UGT1A8	-0.5109	-0.5263	-0.4624	-1.0733	0.06293	0.7178	0.3062	-0.2028	0.4304	0.5196	0.0399	0.6856	0.6183

CHTF18	-0.5103	0.3995	0.2458	-1.1719	-0.6679	-0.5015	0.1736	0.04763	1.0916	0.5641	0.01634	-0.3482	0.599
RNF32	-0.51	0.6726	0.01639	0.1659	-0.4153	0.8717	-0.4504	0.7294	0.68	0.5587	1.7915	-0.2413	1.0407
HMGN2	-0.5093	0.07428	-0.00583	-0.7248	-1.4217	-0.6835	-0.429	-0.2098	0.2216	0.3804	-0.1171	-0.7133	0.1134
EFCAB6	-0.5092	0.4323	0.317	-0.623	-0.1527	-1.3254	-0.505	1.0392	-0.2539	0.6332	0.2369	0.1444	-0.162
SPINT2	-0.5088	0.07988	0.5091	0.9087	0.06726	0.212	-0.1804	1.4869	-0.8333	0.5515	2.3997	1.8516	0.8047
ZWILCH	-0.5087	0.6298	-0.1079	0.06976	0.204	0.6353	-0.06495	1.3477	0.799	1.072	0.1527	-0.00979	0.6162
DLX3	-0.5085	-1.6054	0.915	0.001927	0.5483	-1.6097	-0.287	0.0967	0.3416	0.07159	0.2126	0.6418	1.4271
FCRL2	-0.5079	-0.8422	0.2418	0.1898	-0.3006	0.6662	-0.4652	-0.08357	0.4691	0.4048	-0.02539	0.6347	1.1771
HINFP	-0.5073	0.05044	0.893	-0.1854	-0.06074	-0.3354	0.6524	0.6647	0.2262	0.5419	1.4286	0.8365	0.1972
SLCO2B1	-0.5072	-0.2106	-0.5164	-0.7419	-0.5342	0.4337	0.01083	-0.1975	0.3953	0.3472	0.4521	-0.00446	-0.2703
HSD17B4	-0.5072	0.4922	1.3523	0.2028	-0.5301	-0.146	-0.8984	0.3247	0.4813	1.0692	0.3593	0.6957	0.8846
CYP4X1	-0.5067	0.2091	-0.6518	-0.1437	0.1473	0.152	0.1546	0.4919	0.2833	-0.399	0.6351	0.6519	0.4031
GPR180	-0.5061	0.2382	0.1699	-0.1555	0.2605	-0.07927	-0.00818	-0.1615	0.02202	-0.04616	1.2299	1.0842	0.6855
GGA2	-0.5055	-0.4214	0.2195	0.4873	-0.1598	0.8886	-0.2008	0.8452	0.08079	0.9076	-0.3624	2.0141	1.4592
ROPN1	-0.5054	0.599	1.4661	-1.2406	0.2555	-0.05564	-0.03811	1.5098	-0.2691	1.3305	0.4865	1.6795	1.1917
RNF2	-0.5051	0.2047	-0.2062	-0.3407	0.3763	-0.4571	-0.3874	0.1018	-0.05651	0.1493	0.2373	-0.05373	0.3006
PRDM13	-0.5048	-0.05576	0.4954	1.1659	0.6226	0.7122	0.9089	1.8696	-0.2528	1.9789	0.4223	1.9631	2.2205
NEK9	-0.5047	-0.7272	-0.2527	-0.5617	-0.44	-0.4798	-0.1655	-1.0089	0.2103	0.5708	-0.2089	0.1434	-0.09123
SLC6A18	-0.5035	0.5192	1.1108	1.3361	0.1618	2.6075	0.7677	2.0234	0.5958	2.3252	1.7632	2.9943	1.7735
SLC5A7	-0.5032	0.126	-0.07253	-0.1859	0.1625	-0.9483	0.7874	0.846	1.3824	0.05014	0.591	0.5339	-0.1564
ZNF813	-0.5023	-0.1201	0.08307	-0.2295	0.05713	-1.4293	-0.1052	0.06897	0.6871	-0.1755	0.7689	-0.259	0.1828
KDELR2	-0.502	-1.2448	-0.5547	-0.3239	0.535	0.165	0.3005	0.5234	-0.2405	0.5784	1.1142	-0.0411	0.3719
KRT79	-0.5018	-0.09625	-0.2196	-0.821	0.01874	-0.5337	-0.1138	0.7254	0.6917	-0.2967	0.06672	-0.1573	-0.3682
AP3S1	-0.5018	-0.2819	0.7022	0.1569	0.2318	-1.0918	-0.9245	0.05788	0.4056	1.3321	-0.3886	1.383	0.2529
KCNH3	-0.5012	-0.761	0.3262	-0.6369	-0.05894	-0.624	-1.1603	-0.5693	0.5342	0.009643	-0.3318	0.05279	0.1456
RNF114	-0.501	0.2592	-0.00373	-0.4066	-0.1579	-0.9753	0.4239	0.5529	0.5901	-0.06397	0.4291	0.08089	-0.03706
SRY	-0.501	-0.3105	0.1268	0.5828	0.4403	0.08408	0.6278	1.094	0.1942	1.0489	0.5711	0.06093	1.0627
CPT1B	-0.5005	-0.3086	0.6805	-0.7164	-0.01222	-0.3859	-0.4021	0.1851	0.4867	1.3142	-0.2016	0.9407	-0.4216
ADPRH	-0.5004	-0.5059	0.8041	0.1145	-0.07427	-0.1986	-0.2905	0.2954	0.1464	0.07763	0.6977	0.3623	0.29

Table 4: Overlapping of Two Lists of Candidate Metastatic Essential Gene**Gene Name**

LDHC
PDP1
JUB
MAP3K7
CUL2
ACTG2
AGTR1
MAT1A
OSCAR
PHTF2
MED27
LUC7L2
ADAM7
PTPRJ
CLCA4
PIK3CB
ZNF645
CDHR5
GEM
ZNF37A
MAPK1
SIRPG
GLUL
HLA-DPA1
EIF2AK3
FAM108B1
ZNF611
NHP2L1
ZNF76
FLG2
TRPT1
ZNF514
SORCS3
PVRL4
IL17A
MUSK
LOC100287382
PROCR
ZNF222
HLA-DRB5
SLC28A2
LOC100290936
TGFBR1
ZSCAN4

ZNF585A
ZNF524
KCNK2
ZNF585B
ZNF628
RGS1
TNK1
CDC42BPB
TAF1B
ENOX2
FGF9
UBE2G2
SPI1
NBEA
ZNF347
DDI2
ST6GALNAC6
RDH8
SERPINA4
MC5R
CEACAM6
SERPINA1
BHLHE41
AMY2A
SIK3
TAF1L
STS
CES1P1
STX3
LYN
PAPD5
OSTM1
MXD4
INHBA
PFDN1
NAALAD2
TDGF1P3
USP21
GUCY1B2
OR6V1
NUP107
PRSS42
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CIB3
IRS2
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SIX4
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RFK
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ARFGAP3
ADORA2B
BBS7
KCNA2
GLUD1
MEIS3
DOCK2
DPCR1
PPIL3
PCDHA13
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EFEMP1
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TNFSF10
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DLG2

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TRAIP
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COL9A1
CDH7
DCX
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SELPLG
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COL4A2
RNASE4
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UBE2Q1
NCSTN
LEP
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OR1E1

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SMAD9
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LGALS3
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PTPN13
PMF1
DDX5
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GNAT2
LAMA2
RNF8
CD55

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RXFP1
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THBS2
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FZD3
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FCGR2C
GRIA1

CLEC3A
NINL
ABCC3
CALM3
CHN2
BIK
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OBP2A
FGF10
GATA1
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TRIM43
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ROBO1
MS4A1
SLC4A2
SLC4A1
ROBO3
GLP2R
SPRED1
CUTC
SCUBE3
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ZNF813
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NR0B2
CDKL3
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ISCU
C5orf32
TIAL1
SNRPA
SNRPF
LMBR1
SLC38A2

10-Mar

SSH3
LOC100507699
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GMIP
GALC
EFCAB1

RNF11
SFTPC
GNMT
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RFX5
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ITGA3
AK4
SUGT1
TET1
WIF1
Luciferase
OR6K6
RSC1A1
ZNF85
METAP1
PRKAG1
SGPP2
IL21R
SLA
FOS
CD96
RMND5A
ACOT11
MKKS
CNTNAP1
CALCRL
NACAP1
KHDRBS2
MPP1
LEPREL2
CHST2
OSGEPL1
LMBRD1
FSHR
ARHGAP23
SACM1L
ACVR2B
HIPK1
MATR3
CAMK1D
AOC3
SMARCAD1
ADPGK
SPOCK1
PLBD2

GLRX2
UGT1A7
NPAS1
TNRC6C
UGT1A3
TMEM33
MAP3K1
SCG3
UCK1
PIK3R6
LACTB
CRSP8P
GIMAP4
CPPED1
FETUB
DIS3
TSLP
SLC17A4
SLC6A8
POFUT2
CYP4F3
TSSK3
CSN3

Table 5: Go Enrichment of Candidate Metastasis Genes

Gene Set Name [# Genes (K)]	Description	# Genes in Overlap (k)	p value
ACTIVATION_OF_MAPK_ACTIVITY [40]	Genes annotated by the GO term GO:0000187. The initiation of the activity of the inactive enzyme MAP kinase by phosphorylation by a MAPKK.	6	1.21 e ⁻²
HOMEOSTASIS_OF_NUMBER_OF_CELLS [20]	Genes annotated by the GO term GO:0048872. The biological processes involved in the maintenance of the equilibrium of cell number within a population of cells.	4	1.45 e ⁻²
POSITIVE_REGULATION_OF_MAP_KINASE_ACTICTIVITY [46]	Genes annotated by the GO term GO:0043406. Any process that activates or increases the frequency, rate or extent of MAP kinase activity.	6	2.32 e ⁻²
RECEPTOR_SIGNALING_PROTEIN_SERINE_THREHREONINE_KINASE_ACTIVITY [34]	Genes annotated by the GO term GO:0004702.	5	2.32 e ⁻²